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EDIBLE FISHES OF QUEENSLAND.

By J. Douglas Ogilby (Ichthyologist).

Part XV.—SERRANIDÆ (No. 1).

(Plates I to III.)

Percalates Ramsay & Ogilby, Proc. Linn. Soc. N. S. Wales, xii, 1887, p. 182; Ogilby, Edib. Fish N. S. Wales, 1893, p. 2; Boulenger, Catal. Percif. Fish., 1895, p. 132. Type—*Lates colonorum* Günther 1863.

Body subovate and compressed. Scales moderate, adherent, concentrically striated, more or less strongly ciliated, those of the throat and breast small. Lateral line complete, continued on the base of the caudal fin, the tube simple and straight, not extending to the border of the scale. Head large and partly naked, the upper profile variable. Mouth terminal and protractile, with wide oblique cleft, the lower jaw more or less projecting, the maxillary large and dilated, exposed, with well developed supramaxillary. Teeth in villiform bands, on the jaws, vomer, and palatines; tongue toothless. Nostrils of moderate size, approximate, opening in front of the middle of the eye, and much nearer to it than to the edge of the preorbital, the anterior valvular. Preorbital, suborbital, and vertical border of preopercle serrated; angle and lower border of preopercle armed with strong teeth, which on the latter may be antrorse; opercle with two divergent spines, the lower much the longer; postclavicle and posttemporal usually serrated. Two dorsal fins, connected at the base, the first with viii, rarely ix, strong pungent spines, the interspinous membrane deeply cleft; second dorsal shorter than the first, with i 8 to 11 rays, the base concealed by a low scaly sheath. Caudal emarginate, with 17 principal rays. Anal short, with iii 7 to 9 rays, extending well beyond and similar to the second dorsal. Pectoral obtusely pointed, with 12 to 16 rays, the upper middle ones the longest. Ventral longer than the pectoral with i 5 rays, inserted a little behind the pectoral-base. Gill-openings wide; gill-membranes separate, free from the isthmus; six branchiostegals; pseudobranchiæ present; gills four, a slit behind the fourth; gill-rakers stout and well developed, in moderate number; pharyngeal bones large, densely covered with small teeth. Air-bladder present, large. Stomach cæcal, intestinal canal convoluted, pyloric appendages in moderate number. Posterior processes of the premaxillaries not extending to the frontals; parietal and supraoccipital bones not extending to between the postfrontal processes; supraoccipital crest strong, not produced on the frontals. Vertebræ $11 + 14 = 25$.

Monotypic. The single species inhabiting the fresh waters and estuaries of Southern and Eastern Australia, from the Gulf of Saint Vincent, S.A., to the Pine River, S.Q.

Notes:—Boulenger describes and McCoy figures the scales of this fish as being "cycloid." Of the numbers which I have examined I have never seen one to which this description could be correctly applied; the strength of the ciliation is, however, extremely variable, and some specimens only show it weakly along the middle of the side, where about half a dozen small teeth are alone present on the middle of the outer edge of the scale, leaving a broad dorsal and abdominal cycloid band. Normally, however, the scales of the estuarine forms show distinct ciliation, except those of the nape and a narrow, gradually contracting band below the base of the spinous dorsal, where they are constantly cycloid. And this variation in the scale-character of those examples which more or less permanently reside in the brackish water of an estuary, leads naturally on to the much coarser ciliation of the scales of those individuals which have taken on a more or less purely fluviatile existence. This character, therefore, is manifestly of no value as a specific factor. With regard to the emargination of the upper profile of the head, on which Stead lays so much stress, I find that this is wholly caused by the usually more marked convexity of the snout in the estuarine form, which necessarily induces a hollow between the snout and the occipitonuchal convexity. As, however, I have examined several of these fishes in which, through the straightening of the snout-contour, the emargination was practically eliminated, it will be understood that I can not see my way to accepting this character as of specific value, the difference being in my opinion more apparent than real.

PERCALATES COLONORUM (Günther).

Lates colonorum Günther, Ann. & Mag. Nat. Hist. (3) xi, 1863, p. 114; Castelnau, Proc. Zool. & Accl. Soc. Vic., i, 1872, p. 43; McCoy, Prodr. Zool. Vic., dec. ii, 1878, pl. xiv; Macleay, Proc. Linn. Soc. N. S. Wales, v, 1881, p. 304; Tenison-Woods, Fish & Fisher. N. S. Wales, 1882, p. 31, pl. i; Johnston, Proc. Roy. Soc. Tas., 1882, p. 59; O'Connor, Proc. Roy. Soc. Queensl., xii, 1897, p. 110; Zietz, Trans. Roy. Soc. S. Austr., xxvi, 1902, p. 265.

Dules novemaculeatus Steindachner, Sitz. Akad. Wien, liii, 1886, i, p. 428, pl. i, fig. 2; id., ibid., lx, 1869, i, p. 674; Klunzinger, Arch. f. Nat., xxxviii, 1872, i, p. 20.

Dules reinhardtii Steindachner, ibid., lvi, 1867, i, p. 320.[1]

Lates similis Castelnau, ibid., p. 44; Macleay, ibid., p. 305.

Lates antarcticus Castelnau, ibid.; Macleay, ibid.

Lates victoriæ Castelnau, ibid., p. 45; Macleay, ibid.

Lates curtus Castelnau, Res. Fish. Austr., 1875, p. 5; Macleay, ibid., p. 306.

Lates ramsayi Macleay, ibid.

Percalates colonorum Ogilby, Edib. Fish. N. S. Wales, 1893, p. 2, pl. i; Boulenger, Catal. Percif. Fish., 1895, p. 132; Stead, Fish. Austr., 1906, p. 96; id., Edib. Fish. N. S. Wales, 1908, p. 53, pl. xxii, low. fig.; id., Proc. Linn. Soc. N. S. Wales, xxxv, 1910, p. 659; Roughley, Fish. Austr., 1916, p. 60.

Percalates fluviatilis Stead, Proc. Linn. Soc. N. S. Wales, xxxi, 1906, p. 261; id., Edib. Fish. N. S. Wales, 1908, p. 54, pl. xxii, upp. fig.; McCulloch, Proc. Linn. Soc. N. S. Wales, xxxv, 1910, p. 432; Stead, Proc. Linn. Soc. N. S. Wales, xxxv, 1910, p. 658.

[1] Boulenger, I believe erroneously, quotes this form as *Dules reinwardti*; I follow Günther (Zool. Rec., iv, 1867, p. 159). McCulloch, in answer to a query, kindly writes—"According to my slip, copied from the original reference, the name is *Dules Reinhardti.*"

BASS.

Australian Bass; Perch; Estuary Perch; Fresh-water Perch.

Type localities:—Victoria (*L. colonorum*).
Neighborhood of Sydney (*D. novemaculeatus*).
Port Jackson (*D. reinhardtii*).
Gippsland Lakes (*L. similis*).
Melbourne Market (*L. antarcticus*).
Melbourne Market (*L. victoriæ*).
Richmond River, N.S.W. (*L. curtus*).
Waterhole at Parramatta, N.S.W. (*L. ramsayi*).
Rivers of New South Wales (*P. fluviatilis*).

Dorsal contour of body rather more arched than that of the ventral, its width at the shoulder 1·9 to 2·5 in its depth immediately in front of the ventral fins, which is 2·4 to 3 in its length and equal to or a little more than the length of the head. Caudal peduncle stout, its depth 1·37 to 1·6 in its length behind the soft dorsal and 2·4 to 2·67 in the length of the head. Head from two fifths to four fifths deeper than wide, the upper profile varying from linear in fluviatile examples to emarginate in those which remain permanently in estuarine waters, the difference being solely caused by the shape of the snout, the contour of which is more or less rounded in the latter form, thus making with the occipito-nasal convexity an intervening fictitious emargination; depth of head 1·38 to 1·5 in its length, which is 2·55 to 3·25 in that of the body. Snout pointed, its length 3·75 to 4·17 in that of the head. Diameter of eye from one fourth more to one fifth less than the length of the snout and 3·33 to 4·75 in that of the head; preorbital narrow; interorbital region wide and moderately convex, its width equal to one half less than the eye-diameter. Maxillary extending to below or a little beyond the middle of the eye, its length 2·33 to 2·7 in that of the head, the width of its truncate distal extremity 1·33 to 3 in the eye-diameter. Preorbital and suborbital finely and evenly serrated, the edge of the former undulous or emarginate; hinder limb of preopercle linear and subvertical, armed with fine serræ which gradually decrease in size from below and are absent or vestigial on the upper part of the limb; angle and lower limb with a series of strong, more or less curved spines, which are sometimes broken up distally into two or more points and, on the latter may be arranged in groups, each individual spine having a more or less antrorse direction; lower opercular spine two thirds to three fifths of the eye-diameter.

Premaxillary bands of teeth broader than those of the mandible, each separated by a symphysial hiatus, and each diminishing to a blunt point behind; vomerine teeth in an arcuate band, of equal width throughout, as also is the palatine band.

Scales of body more strongly ctenoid in the fluviatile than in the estuarine form, arranged in 48 to 55 series above the lateral line, in 7 to 9/1/16 to 19 between the fifth dorsal spine and the vent. Scales of nape, a strip along the base of the spinous dorsal, throat, and head cycloid. Opercles, postorbital, and parietal regions, and checks scaly, the rest of the head naked; cheek-scales much smaller than the others, in 8 or 9 series between the eye and the angle of the preopercle. Lateral line following the curvature of the back.

Dorsal fins with viii or ix, i 8 to 11 rays, originating slightly behind the pectoral-base, and terminating above the fifth or sixth anal ray; first spine short, 4·2 to 4·75 in the longest, which is usually the fourth, though the fifth sometimes slightly exceeds it, and is 1·67 to 2·67 in the length of the head, the last as long as or a little longer than the second, 1·9 to 2·2 in the longest, and 1·22 to 1·4 in the spine of the second dorsal, which is 1.4 to 1·67 in the longest ray; first, second, or third ray longest, one sixth more to one sixth less than the longest spine, and subequal to the basal length of the second dorsal, which is 1·17 to 1.33 in that of the first; first dorsal ray divided distally, the last split to the base; outer border of soft rays gently rounded. Caudal fin emarginate, with 17 principal rays, the lobes equal and obtusely pointed; the middle rays 1·38 to 1·67 in the upper lobe, which is 3·55 to 3·83 in the body-length. Anal fin with iii 7 to 9 rays, originating below the third or fourth dorsal ray; second and third spines equal or the third a little the longest, intermediate in length to the sixth and seventh dorsal spines, 2·44 to 3·67 in the length of the head, and 1·33 to 1·5 in the first or second ray, which is one tenth to one fourth more than the basal length and 1·8 to 2·2 in the length of the head; outer border linear; rays similar to those of the dorsal. Pectoral obtusely pointed, with 12 to 16 rays, its length 1·55 to 2 in that of the head; fourth or fifth ray longest, extending to below the sixth or seventh dorsal spine. Ventral bluntly pointed, the spine strong and pungent, 1·37 to 1·67 in the length of the first and second rays, which are subequal, 1·44 to 1·7 in the length of the head, and do not usually reach the vent.

Gill-openings extending forward to below the middle of the eye; gill-rakers longer than the gill-fringes, 13 to 16 on the lower branch of the anterior arch, the longest 1·3 to 2·67 in the eye-diameter; pyloric appendages 10.

Upper surface varying from olive-brown to deep olive-green, the head darkest; sides and lower surfaces shading from grayish green to grayish white, the latter and the cheeks sometimes washed with yellow. All the fins olive-green, except the first dorsal, which is gray or lavender; upper half of opercle, ventrals, and anal with a conspicuous blackish blotch in the young.

Described from numerous examples, measuring from 143 to 878 mm., collected at various localities between and including the Snowy River, N.S.W., and the Pine River, Q.

My "Edible Fishes and Crustaceans of New South Wales" being now unattainable, I think it advisable to republish my reasons for rejecting the supposititious species of Castelnau and Macleay, so as to make this article as complete as possible; and at the same time to bring my account of the species up to date by going thoroughly into the claims of *Percalates fluviatilis* to validity. In the work quoted I remark:—

"A few words are necessary here with regard to the forms of the Australian Perch described as new by Castelnau and Macleay, the types of all of which are missing. In 1872 the former created three new species to which he gave the names *Lates similis, L. antarcticus,* and *L. victoriæ.* To these, between the above date and 1881, he added a fourth species, *L. curtus,* from the Richmond River. In 1876, Alleyne and Macleay described, under the name *Pseudolates cavifrons,* a North Australian fish, and in the following year the latter author redescribed the same species as *Lates darwiniensis;* these two names may be at once dismissed from consideration as being mere synonyms of the widely distributed *L. calcarifer,* as an examination of the type specimens at once reveals. Finally in 1881 Macleay described a *Lates ramsayi* from a single specimen taken in a freshwater pool near Parramatta, the type of which is also missing. We have, therefore, in the restricted genus *Percalates,* no less than five spurious species, excluding the original *P. colonorum,* all described from a similar and somewhat limited area, on what appear to be insufficient grounds. That none of the later writers on Australian fishes (Johnston, Catalogue of Tasmanian Fishes, 1882, McCoy, loc. cit., 1878, and Lucas, Census of Victorian Fishes, 1889) except the author (Catalogue of New South Wales Fishes, 1885), venture an opinion on their specific identity or otherwise, is, it must be conceded, a most unsatisfactory state of affairs, and merits, therefore, a more extended inquiry than is usually necessary in such cases."

To these must now be added *Percalates fluviatilis* Stead, the claims of which have been so strenuously put forward by its author. With this form I shall deal on a future page. Of Steindachner's two species, both from Port Jackson or its immediate neighbourhood, I am unable to say anything from personal knowledge, not being in a position to consult his descriptions or figure, but there can be no doubt as to their identity with one or other of the forms of *P. colonorum.* Of the first, *Dules novemaculeatus,* indeed, McCulloch writes as follows:—"It appears to me that Steindachner's figure of *Dules novemaculeatus* exactly represents the slender form; and, beyond such differences as would be caused by shrinkage due to different methods of preservation (alcohol Steindachner and formalin Stead), it does not differ from Mr. Stead's figure published in the Edible Fishes of New South Wales."

My original remarks regarding Castelnau's four species are:—

"In *L. similis* the characters relied on for its separation from the type species are absurdly inadequate; these are the shorter snout, which is 'sensibly less than the diameter of the eye'; with the majority of fishes the comparative size of the eye to the head and to the snout varies with the age of the individual, the young fish having that organ much larger proportionately than the adult. As I have shown above the great variation existing between the comparative measurements of the eye and the snout in twenty five specimens of indubitable *P. colonorum,* ranging from Adelaide to the Richmond River, it is manifest that the stress laid upon this character is altogether misleading, and must be regarded as valueless. The coarser denticulations of the preopercle are also a sign of immaturity, and as such unreliable. In the large series which has passed through my hands specimens have in rare instances occurred in which the teeth of the lower preopercular limb were directed absolutely downwards; neither this character nor that of the omission of one of the dorsal rays can, therefore, be taken as a valid reason for separating *L. similis* from Günther's well known species."

As regards the length of the snout this is, in Mr. Stead's selected specimen of *P. fluviatilis,* measuring 145 mm., one fourth less than the eye diameter, and even in the 275 mm. example forwarded by the New South Wales Fisheries Department, the two are of equal length, while in the former the preopercular dentition is everywhere exceptionally strong, and in the latter there are but nine soft dorsal rays, so that in these two picked specimens all the characters of *L. similis* are present. It is worth noting that in Castelnau's five descriptions of *Lates* not once does he mention the shape of the head; it is, therefore, presumable that he attached no weight to this character.

Of *Lates antarcticus* Castelnau I wrote:—

"It is unnecessary to go at any length into the question of the validity of *L. antarcticus,* since, with two exceptions, a comparison of Castelnau's description with that given above, will show that no characters are put forward, which are not equally common to *P. colonorum.* These are the increased number of branchiostegal rays, which is stated to be seven in this species as against six, which the examination of numerous specimens has shown to be the normal number in *P. colonorum* as here and elsewhere stated, and also recorded by Prof. McCoy. I do not, however, attach any importance to this seeming discrepancy, since it is possible that the number is merely copied from the generic description of *Lates* given by Günther and which is correct of that genus,[2] as restricted to the two species *L. niloticus* and *L. calcarifer.* It may be further pointed out that in few, if any, of his descriptions of new genera and species does Castelnau take notice of this important character. The second exception, namely the coloration, is not of sufficient importance to justify the retention of *L. antarcticus* as a distinct form, and this name also must, therefore, sink into a synonym of the typical species. Further on (*see* p. 7) I shall have occasion to refer to a form which, by a casual observer, would be set down as distinct, but which, scientifically examined, is easily seen to be no more than a local variety of the common Australian Perch due to the greatly changed conditions under which it exists. This form may possibly be the *L. antarcticus* of Castelnau, though, if so, it is difficult to say why he should especially designate it the 'Sea Perch.'

"Of *L. victoriæ* it is needless to say more than that no rational person is likely to believe that the substitution of a four pointed for a single pointed spine on the opercle is of itself sufficient to constitute a species.

"In Castelnau's last form *L. curtus* it is only necessary to point out that no reliance can be placed on the depth of the type specimen as indicative of even a variety. The proportion of depth to length is given by him as 1 to 3·33, but examples from Port Stephens, Shoalhaven, Shellharbor, and Ulladulla, examined by the writer in preparation of this article, ranged between 1 to 2·75 and 1 to 3·5. This character, therefore, having proved invalid, and there being no other on which to rely, it follows that *L. curtus* should be merged in *P. colonorum.*"

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[2] Brit. Mus. Catal. Fish., i, 1859, p. 67.

I find all the alleged differential characters attributed to these three latter species—*L. antarcticus, L. victoriæ,* and *L. curtus*—reproduced in one or other of the four examples forwarded to me from New South Wales, thus further proving their worthlessness, if that were necessary.

Nothing now remains but to consider the claims of Macleay's *Lates ramsayi,* and a very cursory glance at the description suffices to show that no mandate to specific recognition can be with justice urged on its behalf. Stress seems to have been laid by its author on the fact of this, to him, unique example having been provided with ten dorsal spines and seven anal rays; variations such as these are, as has been shown above, by no means so uncommon as is generally supposed, though the coincidence of their occurrence in the same individual is no doubt much more rare. In no other character does Macleay's diagnosis differ from that of individual specimens of our common Perch, and it, therefore, with the preceding four, must be relegated to the list of useless synonyms. The fact of its having been taken in a land-locked waterhole[3] doubtless had some effect on its external appearance and thus helped to deceive its describer.

"Mention was made above of a variety of the common Perch which differed greatly in outward appearance from the ordinary fish. So far these fishes have only been sent to the Australian Museum from the pools in the Snowy River immediately below the Falls, but without doubt other rivers, both of New South Wales and Victoria, will, now that notice is drawn to the form, be found to have evolved under similar circumstances a similar variety. The differences between it and the common market fish, which present themselves at a casual glance, are the much more elongate habit, the proportionally longer and more powerful fins, and, though this is a much less important characteristic, the brilliant silvery color of this variety. A moment's thought, however, will suggest that these differences, however important they may at first sight appear, are only to be expected in fishes living under conditions, which differ so greatly from those under which the species normally exists; for, being practically forced to inhabit rapidly running waters, subject to sudden, severe, and periodical floods, caused for the most part by the melting of the snow on Kosciusko and the neighboring ranges, it is patent that their changed surroundings and conditions of life would induce a change in the direction indicated.

"To Mr. A. M. N. Rose of Campbelltown I am indebted for the knowledge of this well marked form, that gentleman having forwarded to the Australian Museum at my request two specimens, the first taken at Christmas the second late in the autumn. Neither of these fishes showed the slightest traces of spawning though, if they breed in the river, it is incredible that the season selected for the deposition of its ova by a fish notoriously fond of warm sheltered spots, should be other than one of the two seasons during which my informant forwarded them. Mr. Rose, however, is of opinion that these fishes do not breed, at least not in the river, and he bases his opinion on the facts, certified to me by him, and through him to me by other residents of the district, that the examples caught vary but little in size, the usual length being from fourteen to eighteen inches, that no young fish have ever been observed, that no matter at what season of the year they are captured no milt or roe has ever been found in the ovaries, that they are always in fine condition, and finally that they infinitely excel the estuary Perch in flavor.

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[3] Not in the Parramatta River as stated by Macleay (6).

"The obvious inference is that certain individuals having made their way into the Snowy River at its entrance into the ocean gradually work upwards and eventually find themselves in the pool below the Falls, and being unable to proceed, remain there until captured or swept downward by flood to the estuary again; these latter having, since their enforced return into calmer and warmer waters, grown sybaritic and fat, may possibly be Castelnau's 'not very common' *L. antarcticus,* which he describes as 'silvery' and 'very savory.' "

The sterility of those fishes, which remain permanently in the pools below the Falls, would be satisfactorily accounted for by the coldness of the water.

Having now cleared the way I shall proceed to discuss the status of the latest claimant to specific honors, Mr. Stead's *Percalates fluviatilis.*

Stead (4) insists on

(*a*). "*The far more elongate habit.*"

(3) In the four New South Wales examples on which these remarks are wholly based the extreme variation in the depth of the body to its length is 2·44 to 2·87. This is by no means excessive and shows incontestably on how slender a foundation this character rests. In any case the somewhat more slender habit of the fluviatile form and its rather longer and stronger caudal peduncle may clearly be accounted for by the fish's permanent occupation of swiftly running water, as compared with the more equable ebb and flow of the estuarine tideways which *P. colonorum* mostly affects.

(*b*). "*The non-excavate character of the upper profile of the head, which in P. colonorum is universally concave—often highly so.*"

This contention has been dealt with above (*see* p. 2). It is interesting, nevertheless, to point out that in Boulenger's description of the species, he, with six specimens before him drawn almost assuredly from estuarine sources, writes "upper profile of head *sometimes* concave." The italics are mine.

(*c*). "*The relatively greater thickness as compared with the body-length.*"

This is a character of minor importance. The forces contributory to the formation of a more slender type of fish (see "*a*") are also doubtless at work here to bring about in other directions a habit of body more suitable to the changed conditions under which it now exists. For instance in swiftly flowing mountain torrents a fish with a cylindrical body would offer much less resistance to the current than would one of a deeper and more compressed form, and complies with the primary law which enacts that every natural object shall develop along the line of least resistance; it is probable that, as in this case, a species, the environment of which had been changed from that of a quiet and comparatively sluggish existence to one of continued and strenuous exertion, should tend to assume a shallower and broader habit as the years roll by.

(*d*). "*The shorter head.*"

In my four specimens the comparative measurements of the length of the head to that of the body are for *P. fluviatilis* 2·62 to 2·88, for *P. colonorum* 2·55 to 2·67. Since, therefore, they are seen to overlap in so small a series, it is evident that little or no reliance can be placed on this character as evidence of specific differentiation.

(*e*). "*The much more ctenoid character of certain body-scales in all but older specimens.*"

This claim has also been dealt with above (*see* p. 2).

Stead also pointed out that the two forms differed in their habits, but surely that was inevitable in view of their vastly altered conditions of life, and should carry no weight with it.

The only other differential character mentioned by Stead (5) is set forth in the following terms:—"The tail too is larger and altogether more powerful than that of the Estuary Perch." With this contention I have dealt under (*a*).

In conclusion I assert emphatically that from this re-examination I see nothing to cause me to change my previously expressed opinion, that all the various forms of this fish should be united under the original name—*colonorum.* There is absolutely no structural character by which *P. fluviatilis* can be separated from the parent stock while on the other hand every conceivable shade of variation exists, uniting the two forms. *P. fluviatilis* is doubtless identical with the fish alluded to by me (loc. cit. p. 7) as having been sent to the Australian Museum at my request by Mr. Rose from below the Falls of the Snowy River, and rejected by me as not even worthy of varietal rank.

None of the authors, who have so overloaded this species with useless synonyms, seem to have taken into account that owing to diversity of environment; climatic conditions, due not only to their geographical range, but also to the varied altitude at which they may reside; the character of their native streams, whether sluggish and discolored with a muddy or weedy bottom, or clear and sparkling as it flows over a bed of rock and gravel and sand; the nature of the geographical strata over which the stream flows; the great diversity of the food supply; and many other fortuitous circumstances, much greater latitude of variation should be allowed to fluviatile fishes than to their more equably situated marine relatives. And the variation is apt to be greatly accentuated when the particular fish under review leads, as in this case, both a fresh-water and a brack-water existence.

Reproduction:—During the late autumn and early winter months the Bass drop gradually down, from the upper reaches of the rivers and the quiet billabongs, where they make their home during the greater part of the year, to the estuaries, and finally to the purer waters of the open bay off the mouths of their home streams. Here they shed their spawn during June, July, and August, the season being proportionally later the further we proceed north. The ova are pelagic, and the fry, such as escape their numerous enemies, quickly work their way up stream to seek the safer sanctuary of still lagune and billabong.

Uses, etc.:—The Royal Commission on the Fisheries of New South Wales (1880) reported of this species—"It is a very delicious fish, but never attains a great size and is perhaps of more value for the sport it affords to the amateur fisherman than as an article of food." While, in the light of our present-day knowledge, much of this estimate of the Bass' value is liable to provoke a smile, Tenison Woods, from whose work the above quotation is taken, gives as interesting an account of its habits and qualities as a sporting fish as any of his successors—or more so. He writes—"The perch affords good sport to anglers. It loves quiet, shady, and deep holes in the rivers, but when the tide is flowing it may be caught in the stream. It is very voracious. In winter the bait is a small mullet or herring, or better still one of the large grubs that bore into trees. In the early spring months it will take a moth readily, either sunk or on the surface. The artificial salmon fly is also a splendid bait for trolling at this time. When moths are scarce a frog is a good bait at night. It must be fastened so that it can swim or, if dead, must be played upon the water to simulate a swimming frog. No perch can resist that bait at night. In summer grasshoppers, especially that known as the 'Percher,' a red species, are good bait, but the best is a black house-cricket or an earthworm. This is a very attractive bait, and if the perch are in a pool, the lines are no sooner down than the bait is taken. For the rest of the year a prawn is the best bait, that is when crickets cannot be got. The bait should be at least four feet from the float. In landing the fish great care should be used, as the mouth is weak and is easily torn away." These simple instructions appeal mightily to me, some of them are so deliciously Waltonian in their touch, as for instance "if the perch are in a pool," etc.

Stead contributes the following information regarding its capture for the markets:—"The Estuary Perch is a familiar object to most people in the States of New South Wales and Victoria at least, as a few are generally to be seen amongst the fish in every fishmonger's stall. Particularly is this so after heavy freshets in our coastal rivers and during the winter months. After heavy rains have fallen on the watershed of, say, one of our coastal rivers, there is in a short time a superabundance of fresh water, heavily charged with silt and often decayed vegetable matter in the tidal portions of the river; and this has the effect of driving out to the lower and cleaner estuaries or harbour waters, most of the inhabitants, chief amongst which are the Estuary Perch. As there are then many more fish in a given area than previously, the fisherman is enabled to reap a richer harvest with his meshing-nets and his hauling-nets, The same applies to the winter time, when the fishes come down of their own free will to the open water for the purpose of spawning."

Roughley tells us that—"The flesh of the Estuary Perch is firm and tasty, qualities which render it a valuable and highly esteemed food amongst those who dwell in the districts watered by coastal streams. In addition to this its capture supplies a means of enjoyment to those far removed from the great variety of fishes to be found in the coastal waters." He continues it "is rarely seen in the markets during the summer months. When the fish congregate at the mouths of the rivers, usually during June, July, and August, the markets are kept fairly well supplied."

Mr. H. K. Anderson considers that the Bass is undeniably the premier game fish, whether native or introduced, of the Australian rivers.

Dimensions:—Stead remarks—"Though a weight of 5 lb. is attained by this fish, examples of that size are quite uncommon; the more usual size, as seen in the markets, varying from about 12 oz. to 2 lb." Tenison Woods mentions one of 7½ lb. With reference to this weight I remarked—"As many persons are sceptical of this weight it may be worth mentioning that the writer has seen a specimen, which had been retrieved at the Hamilton Wall, Brisbane River, after an unsatisfactory encounter with a shark. This fish was weighed in my presence, and turned the scale at 6 lb. 12 oz., notwithstanding that a large lump had been bitten out of its flank as cleanly as if done by a surgeon's knife."[4]

Range:—Rivers and estuaries of Southern and Eastern Australia from the Murray River, S.A., to the Pine River, S.Q. Rivers of Northern Tasmania.

PLECTROPLITES Gill.

Plectroplites Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 236 (*ambiguus*): typonym only; id., ibid., 1863, p. 286; Bleeker, Arch. Néerl. Sci. Nat., xi, 1876, p. 267.

Ctenolates Günther, Proc. Zool. Soc. London, 1871, p. 320 (*macquariensis* = *ambiguus*); Ramsay & Ogilby, Proc. Linn. Soc. N. S. Wales, xii, 1887, p. 183; Boulenger, Catal. Percif. Fish., 1895, p. 133.

Body subovate and compressed. Scales small, adherent, finely ctenoid, the exposed surface concentrically striated, arranged in regular series. Lateral line complete, not continued on the caudal fin, the tubes straight, not extending to the margin of the scale. Head large, with more or less concave upper profile and long pointed snout, partly naked, the mucigerous system strongly developed. Mouth terminal and protractile, with moderate, oblique cleft, the lower jaw projecting; maxillary almost wholly exposed, only the upper edge slipping beneath the preorbital when the mouth is shut, naked; supramaxillary present. Jaws, vomer, and palatines armed with villiform teeth, the premaxillary and mandibular bands interrupted at the symphysis; pterygoids and tongue smooth.

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[4] Ogilby, Commercial Fishes and Fisheries of Queensland, p. 14, footnote 9.

Nostrils subequal and approximate, situated in front of the upper half of the eye, the anterior valvular. Eyes small and superolateral, wholly anteromedian. Preorbital, suborbital, and subopercular bones more or less finely serrulate; preopercle serrated, the teeth of the lower limb antrorsely directed; opercle with two spines, the lower the longer, and a wide naked membranous flap; posttemporal exposed and serrulate. One dorsal fin, with x 10 or 11 rays, the spines strong and pungent, the spinous portion longer than the soft. Caudal rounded, with 17 rays, the upper and lower simple, the others branched. Anal fin short, with iii 7 to 9 rays, the second spine longer and much stronger than the third. Pectoral rounded, with 15 to 17 rays, the middle upper ones the longest. Ventrals inserted below the pectoral-base, close together, with a strong spine and 5 soft rays, the outer of which is produced in a filament. Gill-openings wide; gill-membranes separate, free from the isthmus; branchiostegals seven[5]; pseudobranchiæ present; gills four, a slit behind the fourth; gill-rakers rather long and stout, in moderate number. Air-bladder present, large and simple. Pharyngeal bones densely armed with minute conical teeth. Stomach cæcal; intestinal canal biconvolute; pyloric appendages in moderate number. Premaxillary processes not extending to the frontals, parietal and supraoccipital bones not extending to between the postfrontal processes; supraoccipital crest strong, not produced on the frontals. Vertebræ $11 + 15 = 26$.

A monotypic genus, the single species inhabiting the rivers of the eastern half of Australia northward to about the Tropic of Capricorn. Not found in the cismontane rivers of Victoria and New South Wales southward of the Clarence Watershed.

PLECTROPLITES AMBIGUUS (Richardson).

Datnia ambigua Richardson, Zool. Erebus & Terror, ii, Ichth., pt. 1, 1848, p. 25, pl. xix.

Dules ambiguus Günther, Brit. Mus. Catal. Fish., i, 1859, p. 270; Klunzinger, Sitz. Akad Wien, lxxx, 1880, i, p. 348.

Ctenolates macquariensis Günther, Proc. Zool. Soc. London, 1871, p. 320, pl. xxxiii.

Dules auratus Castelnau, Proc. Zool. & Acclim. Soc. Vic., i, 1872, p. 55.

Dules flavescens Castelnau, Res. Fish. Austr., 1875, p. 10.

Ctenolates ambiguus Günther, Zool. Challenger, i, 1880, Shore Fish, p. 32; Macleay, Proc. Linn. Soc. N. S. Wales, v, 1881, p. 354; Woods, Fish & Fisher. N. S. Wales, 1882, p. 103; McCoy, Prodr. Zool. Vic., dec. ix, 1882, p. 15, pl. lxxxiv; Ogilby, Catal. Fish. N. S. Wales, 1886, p. 11; Lucas, Trans. Roy. Soc. Vic. (2) ii, 1890, p. 18; Ogilby, Edib. Fish. N. S. Wales, 1893, p. 22, pl. v; Boulenger, Catal. Percif. Fish., i, 1895, p. 134; O'Connor, Proc. Roy. Soc. Queensl., xii, 1897, p. 109; Zietz, Trans. Roy. Soc. S. Austr., 1902, p. 265.

Ctenolates flavescens Macleay, ibid., p. 355; Ogilby, Catal. Fish. N. S. Wales, 1886, p. 11.

Plectroplites ambiguus Bleeker, Arch. Néerl. Sci. Nat., xi, 1876, p. 267; Waite, Syn. Fish. N. S. Wales, 1904, p. 26; Stead, Fish. Austr., 1906, p. 97; id., Edib. Fish, N. S. Wales, 1908, p. 55, pl. xxiii; Zietz, ibid., xxxiii, 1909, p. 268; Roughley, Fish. Austr., 1916, p. 67, pl. xvii.

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[5] Boulenger (loc. cit.) gives the number of branchiostegal rays as "six or seven." I have at different times examined quite a large number of specimens, and have invariably found seven. This should, therefore, be taken as the normal number.

YELLOWBELLY.

Golden Perch; Murray Perch; Kaakaalain (Murrumbidgee natives); Tarkee (Lower Murray natives); Callop (Professional Fishermen of Victoria, *fide* Anderson).[6]

Type localities:—West Australia (*D. ambigua*).
Macquarie River (*C. macquariensis*).
Riverina (*D. auratus*).
Murray River (*D. flavescens*).

Upper contour of body rising abruptly at the nape and much more arched than that of the ventral, its width at the shoulders 1·63 to 1·88 in its depth, which is 2·6 to 3 in its length and as long as or a little less than the length of the head. Caudal peduncle about four ninths deeper than long, its least depth 7 to 7·75 in the body-length. Head about one fifth deeper than wide, its width 1·67 to 2 in its length, which is 2·55 to 2·67 in that of the body. Diameter of eye 1·5 to 2 in the length of the snout and 6 to 8 in that of the head; depth of suborbital two thirds to one half of the eye-diameter; interorbital region convex, its width 5 to 6 in the length of the head. Maxillary extending to below or a little beyond the middle of the eye, its length 2·75 to 2·86 in that of the head, the width of its distal extremity as much as to two thirds of the eye-diameter. Hinder border of preopercle evenly serrated, the teeth at the angle much enlarged, those of the lower border usually arranged in groups.

Tooth-bands of jaws broadest in front, gradually narrowing to an obtuse point behind; vomerine teeth forming an obtusely triangular patch; palatine bands curved, similar to those of the jaws.

Scales in 77 to 88 series above the lateral line; 12 or 13/1/33 to 37 scales between the first dorsal spine and the ventral ridge. Cheek-scales smaller, about half as large as those of the opercle. Lateral line forming a long curve from the upper edge of the opercle to below the last dorsal ray.

Dorsal fin originating a trifle behind the pectoral-base; fourth spine longest, 2·55 to 3·14 in the length of the head, and a little lower than the soft portion, the base of which is clothed with minute scales, its length 1·6 to 1·9 in that of the spinous portion. Caudal fin 4·5 to 4·88 in the body-length. Anal fin originating below the first dorsal ray and terminating somewhat behind the last ray; second spine very strong, usually a little longer than the third, its length 2·83 to 3·7 in that of the head and 1·25 to 1·4 in that of the second and longest ray. Pectoral fin 1·75 to 1·9 in the length of the head, the fifth and sixth rays the longest, extending to below the sixth dorsal spine. Ventral fin, without the filament, a little shorter than the pectoral; the filament more developed in the young, in which it reaches nearly to the vent, obsolete or nearly so in large examples.

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[6] Anderson writes—"Regarding aboriginal names for this fish I do not know, and believe that most of those names used by the present aborigines are 'pidgin English' and quite unreliable; hence I place no value on them."

Gill-rakers 12 or 13 on the lower branch of the anterior arch, the longest equal to or rather less than the gill-fringes and about one ninth of the length of the head. Pyloric cæca 11.

Upper surface of body varying from bronzy to slaty green, the sides more or less richly golden olive, shading below to deep straw-color or even white. Head above purple or purplish brown, the sides green with violet and orange reflections. Dorsal spines lavender, the connecting membranes yellowish gray dotted with blackish; soft portion tawny yellow, becoming darker towards the margin; caudal fin purplish brown, black-dotted; anal basally golden, the distal third deepening to a violet-brown; pectorals and ventrals golden, uniform or dusky-dotted.[7]

In the Thomson River, and possibly elsewhere, there is a dark color-variety, locally known as the "black yellowbelly," in which the normal coloration is more or less completely obscured by an overlying blackish mantle. This may cover the entire head, body, and fins, or may take the form of numerous small black spots, in some cases generally distributed in others arranged in irregular groups, between which the more typical old gold coloring appears. Structurally no difference can be detected between the two forms. For the opportunity of examining this interesting variety I am indebted to their collector, Miss Josephine Bancroft.

Described from nine specimens, measuring from 225 to 380 mm. Two of these are from the Condamine at Dalby, and were presented to the Museum by Messrs. McNaught and Williams; two are from the Upper Noosa, collected by Mr. J. H. Stevens and myself; and the remaining five are from the Thomson River near Longreach. Of the last three belong to the normal, two to the black, form; all five, however, were taken from the same waterhole.

Variation:—In some respects Boulenger's description differs from mine, and notably in regard to the size of the eye, which according to him is "4·5 (young) to 6 (adult) in length of head," whereas I find it "6 (young) to 8 (adult)" in the same; similarly he gives the width of the distal extremity of the maxillary as 1·5 to 2 in the eye-diameter as compared with the 1 to 1·5 of my measurements. His dorsal spines also are longer than I find them, being 2 to 2·5 in the length of the head as against roughly 2·5 to 3 in mine.

Historical:—The earliest notice of this fine species occurs in the first part of the Ichthyology of the Erebus and Terror, where Sir John Richardson published a description and figure taken from two dried specimens, measuring respectively 216 and 356 mm., under the name *Datnia ambigua,* the specific name being suggested by his uncertainty as to which genus, *Datnia* or *Dules,* the fish should more properly be referred. These examples are said to have been collected in "Western Australia" by Sir George Gray, but there is apparently some error as to the alleged locality since, so far as is known at the present day, the species does not occur under natural conditions in any part of the great western State, the rivers of South-Western Queensland being, so far as I can ascertain, the limit of its range in that direction. Fifteen years after the publication of Richardson's description Günther (1) removed the species to the genus *Dules,* giving in the British Museum Catalogue of Fishes a very inadequate account of it, doubtless owing to the fact that he only had the original dried specimens to work on. After an interval of a few years he obtained, through the agency of Mr. Gerard Krefft, a 300 mm. example from the Macquarie River, New South Wales, preserved in liquor, and not at first recognizing its identity with Richardson's fish, proposed for it the new generic and specific names of *Ctenolates macquariensis* which, having in the meanwhile realized its true relationship, he subsequently altered to *Ctenolates ambiguus,* which name remained in general use until towards the close of last century. Gill, however, had previously recognized the necessity of separating the Australian fish from both *Datnia* and *Dules,* and proposed the generic name *Plectroplites* for its reception. This name was rejected by Dr. Boulenger in his account of the serranoid fishes for the good and sufficient reason that at first it appeared as a typonym only, without any indication of the characters upon which it was based. But Boulenger unfortunately overlooked the fact that in the following year Gill published a diagnosis of his genus which, though short, was amply sufficient to establish the validity of the name, so that it is now generally referred to as *Plectroplites ambiguus.* Count Castelnau then took a hand in building up a synonymy for our "yellowbelly," describing it under two new names in the course of three years. In his first essay he calls it the "Murray Golden Perch," and describes it, from large specimens acquired in the Melbourne market, under the name of *Dules auratus,* stating that "it appears to be common in the Murray and other rivers of the Riverina," that it "is much esteemed for the table," and that "it often weighs five and sometimes seven pounds." He notes its similarity to the "*Dules ambiguus* of Richardson and Günther," but considers that the difference of "one ray less in the anal and also less scales on the lateral line" warrants him in separating it from that species. I think, however, that most writers will agree with McCoy that "these differences, which induced Count Castelnau to propose a new specific name, are unimportant." His next attempt, in which he describes a 480 mm. specimen, also from the Murray River, as *Dules flavescens,* is equally futile.

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[7] Of the numerous freshly caught examples which I have handled, not one showed the slightest trace of the scarlet markings mentioned by Castelnau (1), and reproduced by Tenison Woods and Roughley in their respective accounts of this fish, while the absence of any reference thereto by McCoy and Stead suggests that their experience coincides with mine. Castelnau's examples were obtained in the Melbourne market, where they were exposed for sale after a railway journey of many miles from their Murray haunts. Consequently I have little doubt that the scarlet patches were merely due to the extravasation of the blood in the affected tissues.

Reproduction:—In 1893 I wrote in regard to this phase of the life history of the Yellowbelly—"These important considerations in the economy of our freshwater fishes will never be properly understood until a competent officer shall be appointed by the Government to report fully on these and all other matters connected with the fishes and fisheries of our transmontane river systems.'' Such an officer has since been appointed by the Government of New South Wales, and I am here privileged, through the courtesy of the Under Secretary, Chief Secretary's Department, to record Mr. H, K. Anderson's—the officer in question —observations on the breeding of this fish in the waters under his control. These are of such interest that I deem it advisable to publish Mr. Anderson's remarks *in extenso*:—

''In the spring of 1916 and 1917 I was entrusted with the conduct of experimental hatchery operations in relation to Murray Cod and Golden Perch, and the following information regarding the latter species is based on the data gathered on these occasions.

''In the Murrumbidgee River at an altitude of between 370 and 530 feet above sea level many Golden Perch, usually large fishes from five to ten pounds in weight, spawn during October and November in a flooded river. If the season is late, cold and wet, with snow water coming down stream, spawning is considerably retarded, while abnormally warm weather accelerates it.

''The condition of many of the smaller fishes handled by me leads to the belief that there is an autumnal as well as a vernal spawning, but of this I cannot as yet speak with certainty. Examples of fishes with well developed ovaries are captured by net fishermen throughout the whole year.

''Each spawning female, usually found without female companions, is apparently accompanied by a large number of ripe males. I have never yet netted a ripe female Golden Perch without capturing at the same time, and in the same net, from twenty to fifty ripe males.

''The fishes apparently spawn at the edge of the current near the bank, below a spot where a bend in the river leaves a projecting point with comparatively still eddying water behind it. It is in such places that I have caught all the ripe and most of the nearly ripe females so far examined. As a rule the fish were kept in captivity a few days pending complete ripeness. Many Golden Perch, however, spawn in lagoons and outer channels of the river, where the current is not so strong as in the main stream.

''The fertile eggs are semi-buoyant, practically of the same specific gravity as water, and appear to be left by the fishes quite at the mercy of the current.

''The eggs are probably deposited in batches, 50,000 to 100,000 at a time. I do not think the fish, however ripe, has power to eject all her eggs at once because, when artificially stripping, only a limited number of eggs can be extruded without undue pressure, but I found that, after giving the fish a few minutes rest (rolled in wet bagging to prevent struggling), another batch of eggs can be stripped, and so on until all are extruded.

''A five pounds Golden Perch carries from 750,000 to 1,000,000 eggs.

''The unfertilised eggs when first stripped are of a very pale greyish yellow tint. They measure thirty seven to the linear inch (about ·686 mm. each).

"Two hours after fertilisation, at an average temperature of 65° F., the eggs are perfectly transparent under the microscope, moving about in the jars from the bottom to the surface; when water was allowed to drip into the jars for aëration the eggs circulated in ceaseless movement all over the jars from top to bottom; some, probably the unfertilised eggs, floated.

"At two hours after fertilisation the eggs measured thirteen to the linear inch (about 1·954 mm. each), and three hours after stripping, when absorption of water was complete, they measured eight to the inch (3·175 mm. each).

"The egg, after full absorption of water, becomes slightly ovate and is perfectly transparent, resembling a tiny soap bubble with a glistening oil globule at the top.

"The eggs referred to above were stripped at 4·35 p.m. on 18th October, 1917. The first apparent development was visible at 10·15 a.m. on 19th October. This appeared as a tiny foggy opaque spot at the bottom of the egg.

"At 6 p.m. on the 19th October, the foggy spots in the egg had increased in size to nearly one eighth of its capacity, but had assumed no definite shape. At 8·50 the faint outline of the embryo was discernible. At this stage it is colorless, semitransparent, and occupies the bottom of the egg. At 10·50 the embryo, including the opaque foggy mass round which it was curved, had increased in size to about one fourth of the capacity of the egg.

"On the 20th October at 5 a.m. the embryo had further increased, and the eye-spot was visible without magnification. At 12·10 p.m., under a magnification of about fourteen diameters, movement of the embryo was plainly visible, and the foggy mass above referred to had considerably decreased in size. At 10 p.m. the embryo was clearly visible to the naked eye, apparently attached by the head to the oil-globule, and its wriggling movements were distinctly seen without a magnifying glass. At midnight the embryo was still suspended from the oil-globule struggling vigorously in the egg. At 1 a.m. on the 21st fully 75 per cent. of the eggs in the jars contained living struggling embryos.

"At 3 a.m. on the same day a cyclonic wind-storm capsized the oil-stove used to warm the tent where the jars were kept, which with its contents was destroyed by fire in a few moments. Several jars of eggs were carried outside the burning tent, but as the temperature fell rapidly all were lost. I think it probable that the eggs would have hatched out at about 10 a.m. that morning.

"Although I continued netting until the 16th November, and captured many hundreds of Golden Perch, none in spawning condition were secured. The season was exceptionally late, wet and cold, and I am of opinion that the general spawning would not take place until December."

Mr. Anderson supplies also the following note:—

"In November, 1916, similar work was performed in almost identical conditions, and the records obtained were practically the same as above. Eggs collected at 11 a.m. on the 24th hatched out during the afternoon of the 26th. Owing to a sudden rise in temperature that day—minimum 50°, maximum 95°—the water in the hatching shed reached 75°, and all the fry died. The surface of the jars and troughs was covered with oil from the eggs, and a great number of dead fry, about the size of a comma in ordinary newspaper text, were floating at the surface. The shells of the eggs retain their transparency, and quickly dissolve without leaving any sediment or residue."

It is much to be regretted that Mr. Anderson's two attempts to elucidate the larval development of this fish met with unmerited failure in both cases through causes entirely beyond his control, and it is to be hoped that the very failure will further stimulate him to carry on future experimental work to a successful conclusion.

According to Mr. Glencross Smith the Yellowbelly is full-roed early in September on the Darling Downs.

Uses, etc.:—All authorities concur in their appreciation of the edible qualities of this species. Stead writes—"As an article of food the Golden Perch is very well and favourably known, both in the western areas (of New South Wales) and in the cities of Sydney and Melbourne." Roughley tells us that—"As an edible fish the Golden Perch ranks second only to the Murray Cod amongst our indigenous fresh-water fishes. Its flesh is firm and tasty and is well suited to the many methods of preparation for the table. It is deservedly popular and finds a ready sale in the markets." Glencross Smith, while acknowledging its excellence, places it third in rank among our fresh-water food-fishes, considering it inferior to the catfish (*Tandanus tandanus*) and the Murray Cod, while Anderson places above it the Trout Cod (*Oligorus mitchelli*) and the Murray Cod.[8] However he continues—"I do not desire to dogmatise, as I know several men of wide experience, including Mr. Henry Dawson, late Inland Fisheries Commissioner, who place the Golden Perch the first among our inland fishes." From the little I know gastronomically of the two species I am inclined to agree with Mr. Dawson.

From the angler's point of view they are held in good repute, being plucky and determined fighters when hooked. Writing of them in this connection Mr. Smith says—"Yellowbellies lurk in weedy patches under the shade of logs and overhanging trees, and dart out upon their food, taking it with a rush, and are more particular about their food than Cod. They prefer frogs, shrimps, yabbies, worms, and the white grub from the River Oak (Casuarina); also crickets; but they do not care for fish bait. They are fine sporting fishes and will take a spinning bait, and were at one time very plentiful in all our streams, but are gradually being wiped out; dynamite, nets, and no close season being the cause." He has also remarked that the Yellowbelly is the most short-lived of our fresh-water fishes after its removal from the water, invariably dying within five minutes of its capture.

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[8] In Part II of the present volume I hope to deal with the various phases of the genus *Oligorus.*

Anderson remarks—"The food of the Golden Perch consists principally of small fishes, including its own species, yabbies, prawns, and insect larvæ. It prefers live food. The most effective baits for the capture of this fish are small live fishes, yabbies, prawns, and artificial spinners. The Aborigines on the Murray seem to prefer the yabbie. The Golden Perch will not, I think, rise to the surface for an artificial fly, but a salmon fly skilfully worked through the water, particularly if fitted with a spinning head, will tempt them. From the point of view of sport I consider the Golden Perch second among the fishes of the Murray System."

Stead informs us that "it is pre-eminently what might be called a 'still-water' fish, being very abundant in lagoons and billabongs. It is also a 'mid-water' fish; that is, it swims at some distance from the bottom usually. It is a fish of the plains rather than one of the mountains." Further on he says—"Though taken by hook and line, the usual method of capture is by means of a short meshing-net (gill-net) which is set at night across the billabong or lagoon." And, quotes the evidence of a professional fisherman, as telling him "that one of this species will blunder straight into a meshing-net, apparently without seeing it; while a Murray Cod under the same circumstances would swim up to within a short distance of the net, and then quickly take fright and double back again."

Dimensions:—In large rivers, such as the Murray and its more important tributaries, the Yellowbelly grows to a considerable size. The largest weighed by Mr. Anderson was a female, taken in Yanco Creek, which turned the scale at 14 lb. 2 oz. This, however, seems to be quite an unusual size, most writers being content to credit it with a maximum weight varying between 7 and 10 lb.; while according to Roughley the average of the fishes sent to the Sydney Market is from 4 to 5 lb. In the Queensland rivers, with their lesser volume of water, it does not as a rule attain to such a size as in more southern streams, nevertheless specimens approximating to the 10 lb. limit are occasionally captured, and I have before me now a photograph, given to me by Mr. Glencross Smith, of an example taken in Oakey Creek, which weighed 9 lb. 12 oz.

Range:—All the rivers of the Murray System; cismontane rivers of Eastern Australia from the Clarence to the Dawson; rivers of South-Western Queensland—Barcoo, Landsborough, Cooper, and Diamantina (*Anderson*); Thomson River, common (*Miss Bancroft*). Dr. T. Bancroft writes—"The Yellowbelly does not occur in the Burnett River, but I caught a few by netting in the Upper Dawson."

PART XI.—LUTIANIDÆ (No. 2).

LUTIANUS NEMATOPHORUS Bleeker.

(Plate I.)

Mesoprion nematophorus Bleeker, Act. Soc. Sci. Indo-Neerl., viii, 1860, Celebes, p. 56; id., Versl. Akad. Amst., xii, 1861, p. 46.

Lutjanus nematophorus Bleeker, Verh. Akad. Amst., xiii, 1873, Revis. Lutjan., p. 12; id., Atlas Ichth., viii, 1876, p. 47, pl. cclxxxv, fig. 3.

THREADFINNED SEA PERCH.

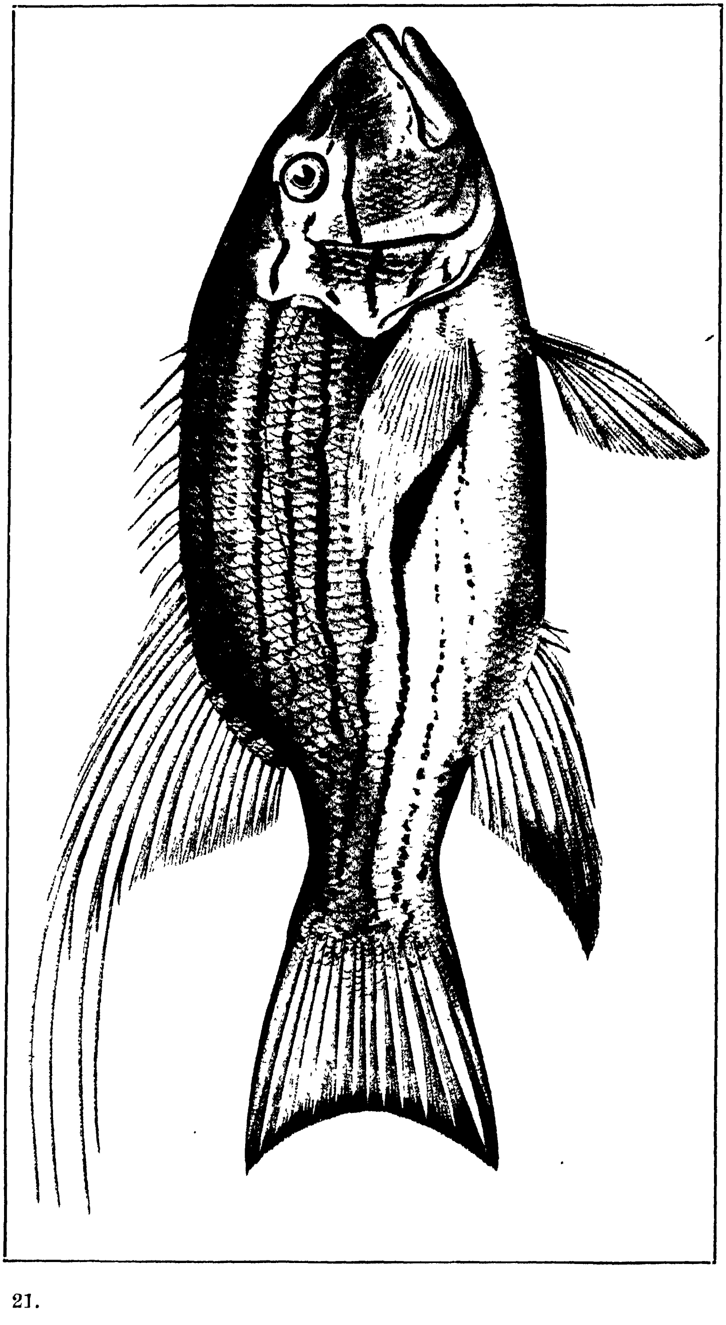
Type locality:—Celebes.

Body deeply subovate and strongly compressed, the dorsal and ventral contours symmetrical, its width 2·55 in its depth, which is 2·55 in its length to the root of the caudal and one eighth more than the length of the head. Caudal peduncle three eighths longer than deep, its least depth 2·5 in the length of the head. Head two ninths longer than deep, its upper profile behind the snout and that of the nape gently and evenly rounded, its width 2·25 in its length, which is 2·85 in that of the body. Snout long and pointed, with linear moderately acclivous profile, its length 2·33 in that of the head. Eye small, its diameter 2·37 in the length of the snout, 5·44 in that of the head, and 1·5 in its distance from the end of the maxillary groove. Interorbital region convex, its width one eighth more than the eye-diameter and 4·87 in the length of the head. Jaws subequal; maxillary extending to below the anterior border of the eye, its length 2·5 in that of the head, the width of its subtruncate distal extremity 1·3 in the eye-diameter. Preopercle with a slight emargination above the angle, in and beyond which it is feebly serrulate; opercle without spine, the lobe obtusely pointed; post-temporal feebly serrated.

Scales in 57 series above the lateral line, disposed somewhat obliquely to the dorsal profile, in 51 horizontal series below the line; 8/1/22 scales between the first dorsal spine and the ventral ridge. Head naked, except the opercle, subopercle, a patch from seven to nine scales wide on the cheek posteriorly, a triserial postorbital band, and a short biserial temporal band. Lateral line with 54 pore-bearing scales, the tubes branched. Soft dorsal and anal fins each with a well developed scaly sheath, the membranes naked; accessory ventral scale small and blunt, 1·5 in the eye-diameter.

Dorsal fin with x 17 rays, originating above the lower angle of the pectoral-base, the spinous portion one fifth longer than the soft; spines low, slender but pungent, increasing in length to the fifth, beyond which they decrease to the ninth; last spine a little longer than the fifth and 3·44 in the length of the head; fourth to seventh rays produced and filiform, extending to or beyond the extremity of the caudal; beyond these the rays gradually decrease, the last being about equal to the fifth spine. Caudal emarginate, the middle rays 1·5 in the upper lobe, which is 3·67 in the body-length. Anal fin with iii 9 rays, originating below the third dorsal ray; spines short and stout, the third longest, 4·14 in the length of the head; soft portion with acutely pointed outline, the anterior rays produced, the fourth the longest, extending beyond the base of the caudal, length

QUEENSLAND FISHES. PLATE I.



LUTIANUS NEMATOPHORUS Bleeker.

Phyllis Clarke, del.

Face page 21.

of soft portion 2·37 in its height, 1·75 in that of the dorsal fin, and 2·55 in that of the head. Pectoral with 16 rays, its length 1·22 in that of the head; fifth ray longest, extending to below the first dorsal ray. Ventral inserted below the end of the pectoral-base; spine rather weak but much longer than the longest dorsal spine, 1·75 in the outer rays, which are subequal, 1·13 in the length of the pectoral, and reach almost to the vent.

Gill-rakers short and stout, 10 on the lower branch of the anterior arch, the longest 1·8 in the eye-diameter.

Roseate, the lower surfaces lighter and obscurely tinged with yellow; body with ten narrow, more or less wavy, longitudinal blue bands; the upper pair meet across the nape; the second pair extend upon the occiput, where they are broken up into irregular spots; the third reaches to above the post-temporal, beyond which it is similarly broken up; the fourth is continued forward to the eye and, though less clearly, along the upper eyelid and across the nostrils, meeting near the end of the snout; the fifth ceases at the opercle; these five pairs terminate at various points along the base of the dorsal fin; the sixth reaches to the eye and is continued on the snout as a series of small blue spots, which meet across the tip of the snout; the seventh extends to the opercle; the eighth to the middle of the preorbital; the two lower to the pectoral, in front of which are some irregular spots and bars; a narrow blue cross-bar between the eyes. All the fins pinkish, the caudal with a narrow dark terminal band.

Described from a fine specimen, 353 mm. long, trawled in Hervey Bay, and presented to the Queensland Museum by the Department of Fisheries through Captain Hoult of the "Bar-ca-Mul."

The species was only known previously from two young examples, measuring 82 and 86 mm., recorded by Bleeker from Singapore and Celebes. Its rediscovery on the South Queensland coast is, therefore, of more than ordinary interest.

PART XVI.—OPISTHOGNATHIDÆ (No. 1).

Opisthognathidæ Jordan & Evermann, Fish. North & Mid. America, pt. 3, 1898, p. 2279; Regan, Ann. & Mag. Nat. Hist. (8) xii, July 1913, p. 138.

THE JAWFISHES OR SMILERS.

Body elliptical to elongate, moderately compressed, more or less completely covered with small, cycloid scales. Lateral line single, incomplete, running close to and parallel with the dorsal contour, ceasing below the anterior dorsal rays. Head large and naked, with strongly curved anterior profile, its upper surface smooth. Mouth terminal, horizontal or nearly so, protractile, the cleft usually very wide; jaws normally formed, maxillary broad and exposed, with supplemental bone. Jaws with bands of villiform or cardiform teeth; vomer usually with a few teeth; palatines and tongue toothless. Two nostrils on each side. Eyes very large, lateral, anterior. Opercles unarmed. Dorsal fin continuous, the spinous and soft portions of nearly equal length, the spines slender and flexible, passing gradually into soft rays. Caudal rounded or lanceolate, with 14 or 15 principal rays, the outer ray above and below simple. Anal fin long and low, with two weak spines. Pectorals short and fan-shaped. Ventrals inserted in advance of the pectorals, close together, each of a spine and five rays, and without accessory scale. Gill-openings wide; gill-membranes partially united, free from the isthmus; six branchiostegals; pseudobranchiæ present; gills four, a slit behind the fourth; gill-rakers long and slender. Air-bladder present, small. No pyloric cæca. A narrow subocular shelf. Skull narrow between and expanded behind the orbits; postorbital part evenly convex above; occipital crest only on the posterior face of the skull, which is long and oblique; no parietal crest; exoccipital condyles separate; prootics forming a roof for the myodome; basisphenoid present. Foramen in hypercoracoid; radials rather broad and flat, two on the hypercoracoid and two on the hypocoracoid. Vertebræ 29 (10 × 19)[9]; precaudals with parapophyses from the fifth; three ribs sessile, five on parapophyses; epipleurals on ribs.

The *Opisthognathidæ,* though weak in point of numbers, forms a most interesting family of trachiniform percoids; it consists of fishes of small or moderate size, inhabiting rocky and coralline bottoms within the tropical and temperate zones. Its distribution is peculiar, no species having so far been recorded from the Mediterranean nor the Eastern Atlantic, nor from any of the Pacific Islands, nor the West Coast of the Americas, except the Gulf of California, where an isolated colony, comprised of five species, exists. The extreme limits of their polar range lie between lat. 40° N., where *Gnathypops hopkinsi* has been taken off Misaki, Japan, and lat. 34° S., where *Merogymnus jacksoniensis* is found. These fishes are everywhere of rare occurrence, many of the species being only known from the single example described. The "Smilers," to give them the local vernacular name bestowed upon them, so a friend tells me, "because of their fine open countenance," are essentially carnivorous and rock-loving fishes, delighting in boulder-strewn shoals and coral reefs at a moderate depth. Hence we find that in America as here many of the species are only known from offshore snapper grounds and similar localities, where they are occasionally taken by hand-line in company with more valuable fishes or even from the latter when captured disgorging them. The species vary greatly in coloration, some of them, such as my *Merogymnus eximius,* being arrayed in a livery of most gorgeous splendor, while others, as my *Gnathypops inornata,* are soberly clad in uniform brown. One of our species, *G. maculata,* is said by the pearl-fishers to scoop holes in the sand among the sea-fan forests of our tropic seas, from which it sallies forth to pounce upon a passing prey, returning again to its lair after each excursion. Regarding this habit Mr. W. H. Longley, from personal observation when "equipped with a diving hood in the unknown world of coral labyrinths at the bottom of the sea," gives some interesting information, which may advantageously be reproduced here.[10] He writes:—"*Gnathypops aurifrons* prepares

[9] Vertebræ 27 to 34, *fide* Jordan & Evermann, *ut supra.*

[10] American Museum Journal, xviii, February 1918, p. 81.

its own shelter in sandy places where the substratum is sufficiently compact to make successful tunneling possible. Jaws and gaping mouth are its only entrenching tools, but meet its every need. It is found not uncommonly upon the open reef in little colonies, the formation of which is probably due in part to the discontinuous occurrence of suitable bottom rather than to the social instincts of the fishes themselves. During the day, if undisturbed, *Gnathypops* may be regularly observed resting nearly motionless in a semivertical position above its burrow. When alarmed it retreats into its hole tail foremost and conceals itself until the disturbance outside has ceased. Then it reappears cautiously, its beady black eyes being so situated that it is able to sweep the horizon with minimum exposure. If nothing happens to renew its alarm, it mounts a little farther until its ventral fins are free, rests for a moment in the mouth of its burrow, and finally rises easily and gracefully to its original position. Still another of these fishes (as yet unidentified) shows a different variation of the tubiculous instinct. It lives in holes, quite possibly worm-tubes, which it discovers ready formed in pieces of dead coral upon the bottom, Its most striking structural feature is the immense dorsal fin, which when raised seems nearly as high as the fish is long. Its most interesting habit is that of protruding its body for about half its length from the chamber it occupies, and then elevating and depressing its great fin rapidly as if it were wigwagging in piscine code. This impression is heightened when two individuals separated by no great distance stand erect and repeat the performance in alternation." Nothing is known as to the breeding habits of these fishes, nor have I ever seen an example with ripe spawn, though all those which I have handled were fully adult. That the young are never found along the foreshores nor in the débris of the seine net seems to demonstrate the demersal character of the ova. No data are available as to their edible qualities, unless it be that of an acquaintance, who took one home and had it fried; he told me it was "as good as any other rockfish." On account of their scarcity and the difficulty of obtaining them all the species are greatly in request for museum collections, and every example should, therefore, be carefully preserved and forwarded, with as little delay as possible, to the nearest scientific institution. Six genera and thirty species are now recognized. As mentioned by Waite it has been suggested in some quarters that *Gnathypops* may merely be the female of *Opisthognathus*, but the fact that the latter genus is quite unknown in Australian waters sufficiently contravenes any such theory.

Appended is a key to the opisthognathoid genera. Those which are printed in italics have not so far been found in Australian seas, but, with the exception of the West Indian *Lonchopisthus* there is no insuperable reason why the other genera should not occur here.

a^1. Maxillary about as long as the head, produced behind in a flexible lamina i. *Opisthognathus*.[1

a^2. Maxillary much shorter than the head, but extending well beyond the eye, its distal extremity truncate.

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[11] Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 1836, p. 498. Type *O. sonneratii* = *O. nigromarginatus* Rüppell.

b^1. Caudal fin rounded.
  c^1. Trunk anteriorly naked .. .. ii. *Merogymnus.*
  c^2. Trunk everywhere scaly.
    d^1. Dorsal spines all simple .. .. iii. *Gnathypops.*
    d^2. Anterior dorsal spines transversely forked .. .. .. iv. *Stalix.*[12]
b^2. Caudal lanceolate .. .. v. *Lonchopisthus.*[13]
a^2. Maxillary not extending beyond the eye .. .. vi. *Owstonia.*[14]

i. MEROGYMNUS Ogilby.

Merogymnus Ogilby, Proc. Roy. Soc. Queensl., xxi, 1908, p. 18 (*eximius*); McCulloch, Rec. West Austr. Mus., i, 1914, p. 216.

Body elliptical or elongate-elliptical, the greater part of the trunk naked. Maxillary much shorter than the head, its distal extremity much dilated. Jaws with bands of villiform teeth, the outer row scarcely larger than the others. Caudal fin rounded. Gill-rakers in rather large number, long, and slender.

Eastern and South-Eastern Coasts of Australia. Two species.

a^1. Scales very small, covering about half of the sides and belly .. .. 1. *eximius.*
a^2. Scales larger, but narrowly entering the trunk; belly naked .. .. 2. *jacksoniensis.*

1. MEROGYMNUS EXIMIUS (Ogilby).

(Plate II.)

Merogymnus eximius Ogilby, Proc. Roy. Soc. Queensl., xxi, 1908, p. 18.

HARLEQUIN SMILER.

Type locality:—Snapper Banks off Moreton Bay, S.Q.

Body elliptical; its width at the shoulder 1·7 to 1·83 in its depth, which is 3·62 to 3·75 in its length and 1·25 to 1·33 in the length of the head. Caudal peduncle four fifths deeper than long, its least depth 2·55 to 2·7 in the length of the head. Head a little deeper than wide, the fronto-occipital profile evenly rounded, its width 1·4 to 1·5 in its length, which is 2·83 to 2·9 in that of the body. Snout short, with linear or gently rounded, vertical profile, its length 1·75 to 1·8 in the eye-diameter, which is 2·83 to 3·2 in the length of the head. Interorbital region narrow and feebly concave, its width 3·43 to 3·75 in the eye-diameter. Maxillary extending to about one diameter of the eye behind the eye, its length 1·4 to 1·5 in that of the head, the width of its distal extremity about two ninths of its length.

Scales extending forwards on the trunk to below the middle of the

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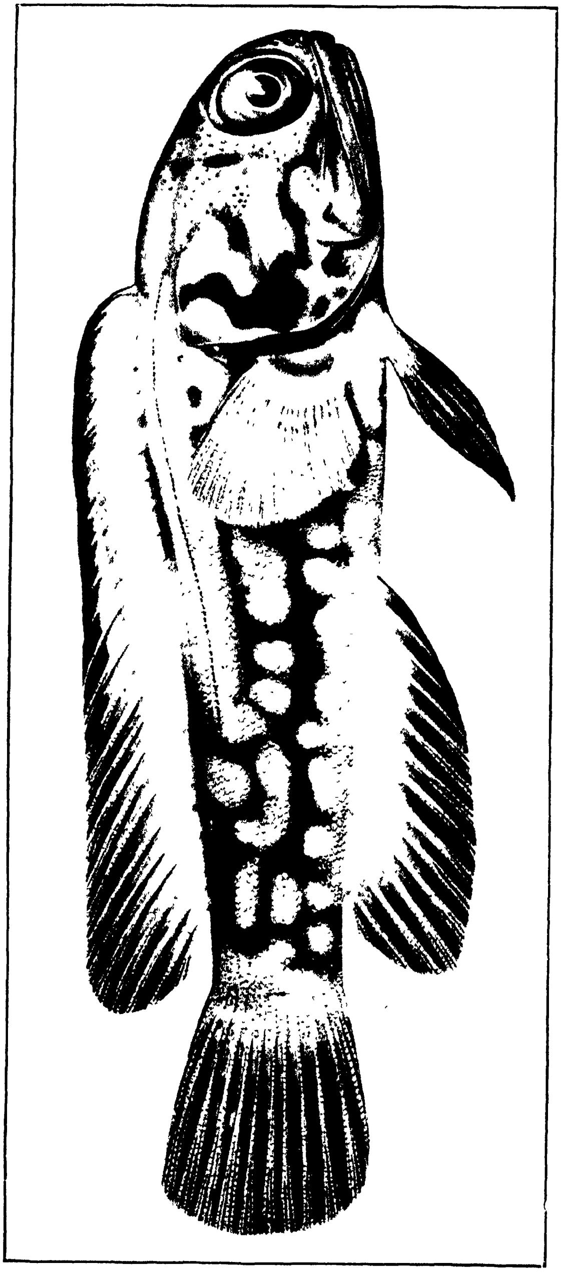
[12] Jordan & Snyder, Proc. U. S. Nat. Mus., xxiv, 1902, p. 495. Type *S. histrio* from the Japanese coast.

[13] Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 241. Type *L. micrognathus* from Cuban waters.

[14] Tanaka, Journ. Coll. Sci. Tokyo, xxiii, 1908, p. 47. Type *O. totomiensis* from the seas of Japan.



MEROGYMNUS EXIMIUS Ogilby.

Phyllis Clarke, del.

Face page 25.

appressed pectoral, anteriorly distant and deeply imbedded, becoming more crowded and finally imbricate on the tail; belly scaly. Lateral line composed of about 80 short tubes, terminating below the 5th or 6th dorsal ray.

Dorsal fin with xi 13 rays, originating above the tip of the maxillary; outer border of the fin linear, the spines and rays gradually increasing in length to the 9th to 11th rays, which are 1·63 to 1·75 in the length of the head. Caudal fin long, 3·9 to 4·3 in the body-length. Anal with i 12 or 13 rays, originating below the 1st dorsal ray, its longest ray 1·7 to 1·83 in the length of the head. Pectoral rounded, with 19 rays, the middle the longest, 1·88 to 2 in the head. Ventral produced, about one third longer than the pectoral, the 2nd and 3rd rays subequal, reaching to or nearly to the vent.

Gill-rakers long and slender, with the inner edge feebly spinulose, 16 + 26 on the anterior arch, the longest 2·16 in the eye-diameter.

Golden or golden brown above; sides with two series of large, round or oval, golden spots, separated by broad blue interlacing bands; abdominal region and extremity of tail violet, with splashes of greenish gold. Head lilaceous, with irregular violet spots and bars; a deep blue blotch, prolonged upwards as an uneven band on the opercle; branchiostegal region blackish. Outer half of spinous dorsal dark olive-green, narrowly bordered above with purple, below with pale blue; the lower band is continued to the end of the soft dorsal, the outer half of which is pale olive-green, with part of the membrane blue, as also is the base. Anal blue, with a median and a basal series of golden spots. Caudal rays olive-green or purple, the interradial membrane blue. Pectoral pale yellowish brown, the base with one or two vertical blue bars. Ventral bluish black.

Described from five specimens, 224 to 305 mm. in total length, in the collections of the Queensland Museum and the Amateur Fishermen's Association. These were taken on the Snapper Grounds off Moreton Bay, where it does not appear to be uncommon, and which is still the only recorded habitat of the species. It is said to be good eating.

Our illustration is taken from a Queensland Museum example. Reg. No. I. 17· 840.

2. MEROGYMNUS JACKSONIENSIS (Macleay).

Opisthognathus jacksoniensis Macleay, Proc. Linn. Soc. N. S. Wales, v, 1881, p. 570; O'Connor, Proc. Roy. Soc. Queensl., iv, 1888, p. 43.

Gnathypops jacksoniensis Waite, Rec. Austr. Mus., v, 1904, p. 210, pl. xxvi, fig. 2.

Merogymnus jacksoniensis McCulloch, Rec. West Austr. Mus.,

SOUTHERN SMILER.

Type locality:—Port Jackson N.S.W.

Body elongate-elliptical, its width at the shoulder 1·6 to 1·75 in its depth, which is 4·33 to 4·5 in its length and 1·4 to 1·55 in the length of the head. Caudal peduncle three fourths deeper than long, its least depth 3·44 to 3·6 in the length of the head. Head a little deeper than wide, the fronto-occipital profile linear or gently rounded and moderately acclivous, its width 1·5 to 1·67 in its length, which is 3·12 to 3·33 in that of the body. Snout short, with feebly rounded subvertical profile, its length 1·5 to 1·63 in the eye-diameter, which is 3·25 to 3·5 in the length of the head. Interorbital region narrow and concave, its width 3·33 to 3·6 in the eye-diameter. Maxillary extending to about one diameter of the eye behind the eye, its length 1·6 to 1·67 in that of the head, the width of its distal extremity 3·16 to 3·5 in its length.

Scales extending forwards along the middle of the trunk to above the vent only, the naked area extending backwards above and below in a gradually contracting band to about the last third of the vertical fins; only those scales on or near the caudal peduncle truly imbricate; belly naked. Lateral line terminating below the 12th or 13th dorsal ray.

Dorsal fin with x 17 rays, originating well behind the tip of the maxillary; outer border of spinous dorsal rounded in front, linear behind, the spines gradually increasing in length to the last, but much lower than the soft rays, the 12th or 13th of which is the longest, 2 to 2·33 in the length of the head. Caudal fin short, 5·16 to 5·67 in the body-length. Anal with i 16 rays, originating below the 2nd or 3rd dorsal ray, the longest ray corresponding to and as long as those of the dorsal. Pectoral rounded, with 20 rays, its length 1·83 to 2 in that of the head. Ventral as long as or a little longer than the pectoral, the 2nd ray somewhat produced, but not nearly reaching to the vent.

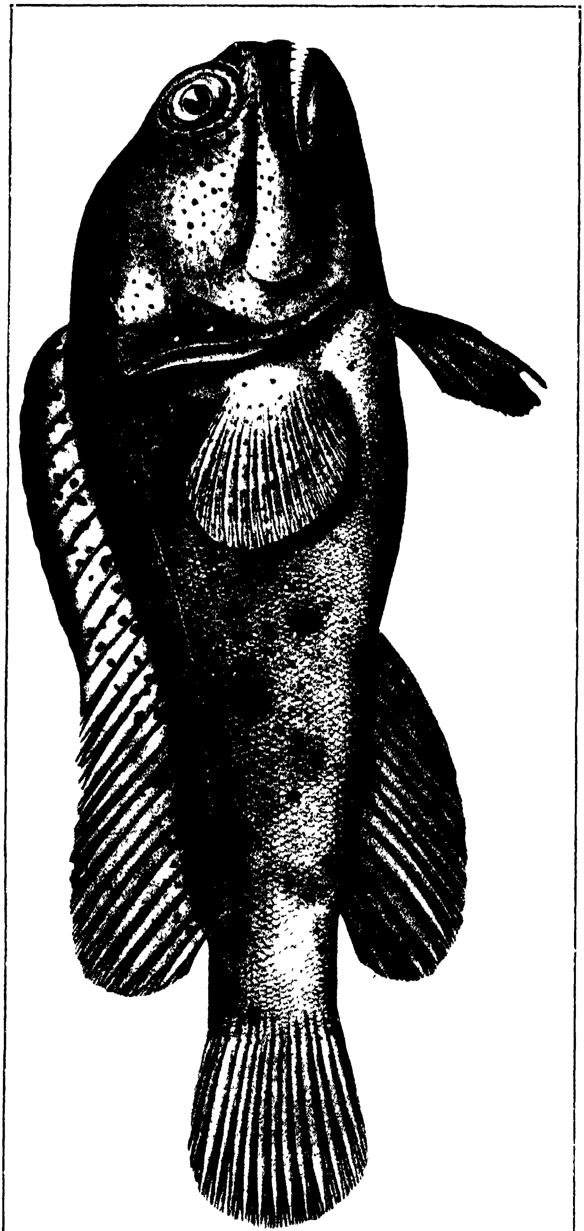
Gill-rakers long and moderately slender, with the inner edge spinulose, 9 + 19 or 20 on the anterior arch, the longest 2·1 in the eye-diameter.

Ground-color varying from rich light brown to lemon yellow, the upper surface and sides of the trunk broadly reticulated with chocolate brown, a wavy median band, which is sometimes black, being always present; throat, breast, and belly immaculate; tail with a few irregular brown spots and wavy lines, each scale with a brown central dot. Upper surface and sides of head profusely dotted and pencilled with brown; inner posterior edges of maxillary and mandible black; distal extremity of maxillary and a broad stripe on the mandible white. Dorsal fin dark purplish brown, with a basal series of lighter spots; soft portion with an additional submarginal row of similar spots and two oblique bands posteriorly. Anal rich brown, with a light basal band. Caudal with three transverse rows of light spots. Pectoral pale yellow, profusely powdered with brown. Outer portion of ventrals purplish black.

Described from four specimens, 212 to 264 mm. in total length, in the collection of the Queensland Museum; they were taken by hook on the Snapper Grounds off Moreton Bay, where, however, it appears to be scarce.

Originally described from Port Jackson in 1881, its range was extended, eight years later, to the Queensland Coast, through a specimen obtained in Moreton Bay by the late Mr. D. O'Connor; these two localities still form the extreme limits of its recorded distribution.

QUEENSLAND FISHES. PLATE III.



GNATHYPOPS MACULATA (Alleyne and Macleay).

Phyllis Clark, *del.*

Waite is certainly incorrect in stating that "the premaxilla is much shorter (than the maxilla), and does not extend to below the hinder margin of the eye." As a fact it is as long as the maxillary, but its distal third is slender and toothless, composed of flexible cartilage. Nor in those which I have examined has the bony interorbital bridge ever been so narrow as described by him.[15]

The name "leopard fish" applied to this species by Waite[16] and Stead[17] is inappropriate, as it rightly belongs to *Plectropoma maculatum* Bloch, the *Holocentrus leopardus* of Lacépède.

ii. GNATHYPOPS Gill.

Gnathypops Gill, Proc. Acad. Nat. Sci. Phila., 1862, p. 241 (*maxillosa*); Jordan & Evermann, Fish. North & Mid. Amer., pt. 3, 1898, p. 2283; McCulloch, Rec. West Austr. Mus., i, 1914, p. 216.

Differs from *Merogymnus* in having the trunk wholly covered with scales, the outer row of teeth enlarged, and the gill-rakers fewer, shorter, and stouter.

The most prolific genus of the family, containing 20 species, ranging from the Persian Gulf through the Indian and Malayan seas northward to Japan and eastward to New Guinea and East Australia. Crossing the Pacific it reappears on the coasts of Lower California and Western Mexico, reaching thence to the shores of the Southern United States, the West Indies, and Brazil. Three species occur in Australian waters, and have been thus classified by McCulloch—

a^1. Body and fins light, with numerous small, dark brown spots .. .. .. 1. *maculata.*
a^2. Body and fins dark, sometimes with irregular, scattered darker spots .. .. 2. *inornata.*[18]
a^3. Head with small, body with large, incomplete, brown rings; dorsal, anal, and caudal fins with oblique bars, the former with a large, black spot anteriorly 3. *darwiniensis.*[19]

3. GNATHYPOPS MACULATA (Alleyne & Macleay).

(Plate III.)

Opisthognathus maculatus Alleyne & Macleay, Proc. Linn. Soc. N. S. Wales, i, 1877, p. 280, pl. ix, fig. 3.
Batrachus punctatulus Ramsay, Proc. Linn. Soc. N. S. Wales, viii, 1883, p. 177.
Gnathypops maculatus McCulloch, Rec. West Austr. Mus., i, 1914, p. 216.

SPECKLED SMILER.

Type localities:—Palm Isles, N.Q. (*O. maculatus*).
Torres Strait, N.Q. (*B. punctatulus*).

Body elliptical, its width at the shoulder 1·84 in its depth, which is 3·1 in its length and 1·2 in the length of the head. Caudal peduncle one and a half time deeper than long, its least depth one third of the length of the head. Head a little wider than deeper, the fronto-occipital profile linear and strongly acclivous, that of the nape rounded, its width 1·33 in its length, which is 2·55 in that of the body. Snout short, with linear, subvertical profile, its length 1·25 in the eye-diameter, which is 3·67 in the length of the head. Interorbital region narrow and concave, its width one third of the eye-diameter. Maxillary extending rather more than an eye-diameter behind the eye, its length 1·5 in that of the head, the width of its distal extremity 3·9 in its length.

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[15] Rec. Austr. Mus., v, p. 240.

[16] Synop. Fish. N. S. Wales, p. 30, No. 231.

[17] Fish, Austr., p. 108.

[18] Ramsay & Ogilby, Proc. Linn. Soc. N. S. Wales, xii, 1887, p. 561; Derby, N. W. Australia. The species has been beautifully figured by McCulloch, Rec. West Austr. Mus., i, pl. xxx.

[19] Macleay, Proc. Linn. Soc. N. S. Wales, ii, 1878, p. 355, pl. ix, fig. 3; Port Darwin, N.T.

Scales everywhere imbricate, disposed in regular series over the whole body, becoming somewhat larger posteriorly. Lateral line terminating below the 9th dorsal ray.

Dorsal fin with xii 16 rays, originating well behind the tip of the maxillary; outer border of spinous dorsal rounded in front, linear behind, the spines gradually increasing in length to the last, but lower than the soft rays, the 8th, 9th, and 10th of which are the longest, a little more than half the length of the head. Caudal fin of moderate length, 4·6 in the length of the body. Anal with ii 14 rays, originating below the 3rd dorsal ray, the rays increasing in length to the 4th, which is 2·37 in the length of the head and as long as the succeeding seven, beyond which they decrease. Pectoral rounded, with 21 rays, all except the upper and lower pair about equal in length, and 2·25 in the length of the head. Ventral longer than the pectoral, none of the rays produced.

Gill-rakers 4 + 12 and some tubercles, rather stout and cultriform, the longest 2·3 in the eye-diameter.

Pale rufous brown, scarcely lighter below, everywhere spotted with dark blue or black, the spots largest on the upper part of the trunk and tail, smallest on the head; a large blackish or smoky brown blotch beneath the appressed pectoral. Spinous dorsal sparsely, pectorals profusely spotted; the other fins immaculate.

Described from a fine specimen, measuring 346 mm. in total length, collected at Dobo, Aru Islands, by Mr. John Colclough, who presented it to the Amateur Fishermen's Association of Queensland, by whom it was kindly lent for the purposes of this review.

This fine species was first described from a small example, 178 mm. long, obtained at the Palm Isles, N.Q., during the cruise of the "Chevert." We next hear of it from Torres Strait, through a specimen forwarded to the Australian Museum by Mr. Cousens, and described as a *Batrachus* by the late Dr. E. Pierson Ramsay. A few years later Saville Kent, when a guest on board H.M.S. "Myrmidon," collected one at Port Darwin, N.T., as recorded by de Vis. From that time I find no record of the species until 1906, when Mr. Banfield sent me a 320 mm. example from Dunk Island, while in the following year the specimen described and figured came into my hands. It is said to be good eating.

LIST OF THE OPISTHOGNATHOID FISHES OF THE INDIAN AND WESTERN PACIFIC OCEANS.

i. OPISTHOGNATHUS Cuvier & Valenciennes, Hist. Nat. Poiss., xi, 1836, p. 498 (*sonneratii* = *nigromarginatus*).

1. *nigromarginatus* Rüppell, Atlas Fisch. Roth. Meer., 1828, p. 114.
   Distribution:—Red Sea and Mozambique Channel through the Seas of India and Malaysia to Celebes and Batchian.
   Dimensions:—To 180 mm.
   Figure:—Day, Fish. India, pl. lvii, fig. 5.

ii. MEROGYMNUS Ogilby: *see* p. 24.

2. *eximius* Ogilby; *see* p. 24.

3. *jacksoniensis* Macleay; *see* p. 25.

4. *iyonis* Jordan & Thompson, Proc. U. S. Nat. Mus., xlvi, 1913, p. 65. Only known from the type.
   Distribution:—Iyo, Shikoku, Japan.
   Dimensions:—74 mm.
   Figure:—Jordan & Thompson, ibid., text-fig. 1.

iii. GNATHYPOPS Gill: *see* p. 27.

5. *darwiniensis* Macleay, Proc. Linn. Soc. N. S. Wales, ii, 1878, p. 355.
   Distribution:—Port Darwin, N.T. Only known from the type.
   Figure:—Macleay, ibid., pl. ix., fig. 3.

6. *dendritica* Jordan & Richardson, Bull. U. S. Bur. Fisher., xxvii, 1908, p. 261. Only known from the type.
   Distribution:—Cuyo Island, Philippine Archipelago.
   Dimensions:—133 mm.
   Figure:—Jordan & Richardson, ibid., text-fig. 9.
   This species should be carefully compared with the preceding.

7. *evermanni* Jordan & Snyder, Proc. U. S. Nat. Mus.. xxiv, 1902, p. 493. Only known from the typical specimens.
   Distribution:—Wakanoura, Japan.
   Dimensions:—80 mm.
   Figure:—Jordan & Snyder, ibid., text-fig. 6.

8. *hopkinsi* Jordan & Snyder, ibid., p. 492.
   Distribution:—Misaki and Sagami, Hondo, Japan.
   Dimensions:—To 80 mm.
   Figure:—Jordan & Snyder, ibid., text-fig. 5.

9. *inornata* Ramsay & Ogilby, Proc. Linn. Soc. N. S. Wales, xii, 1887, p. 561.
Distribution :—Coast of North-Western Australia (Derby and Port Headland).
Dimensions :—To 485 mm.
Figure :—McCulloch, Rec. West Austr. Mus., i, pl. xxx.

10. *macrolepis* Peters, Mon. Akad. Berlin, 1866, p. 520.
Distribution :—Bangkok, Siam, to the Philippines.
Dimensions :—To 100 mm.
Unfigured.

11. *maculata* Alleyne & Macleay; *see* p. 27.

12. *muscatensis* Boulenger, Proc. Zool. Soc., 1887, p. 662.
Distribution :—Persian Gulf at Maskat, Arabia.
Dimensions :—To 305 mm.
Figure :—Boulenger, ibid., pl. liv, fig. 1.

13. *papuensis* Bleeker, Versl. Akad. Amst. (2) ii, 1868, p. 33.
Distribution :—Waigiu.
Unfigured.

14. *rosenbergii* Bleeker, Nat. Tijds. Nederl. Ind., xii, 1857, p. 220.
Distribution :—East Coast of India to Nias.
Dimensions :—To 120 mm.
Figure :—Day, Fish. India, pl. lviii, fig. 5.

15. *solorensis* Bleeker, ibid., v, 1853, p. 81.
Distribution :—Goram, Amboina, Solor.
Dimensions: To 83 mm.
Unfigured.

16. *versluysi* Weber, Siboga Fische, 1913, p. 261. Only known from the type.
Distribution :—Roma Island.
Dimensions :—136 mm.
Figure :—Weber, ibid., text-fig. 65.

iv. STALIX Jordan & Snyder, Proc. U. S. Nat. Mus., xxiv, 1902, p. 495 (*histrio*).

17. *histrio* Jordan & Snyder, ibid. Only known from the type.
Distribution :—Bay of Nagasaki, Japan.
Dimensions :—62 mm.
Figure :—Jordan & Snyder, ibid., text-fig. 7.

v. OWSTONIA Tanaka, Journ. Coll. Sci. Tokyo, xxiii, 1908, p. 47 (*totomiensis*).

18. *totomiensis* Tanaka, ibid.
Distribution :—Off the Province of Totomi, Japan. Only known from the type.
Dimensions :—500 mm.
Figure :—Tanaka, Fish. Japan, pl. viii, fig. 26.

NOTES ON THE BIOLOGY OF SOME QUEENSLAND FLIES.

By Professor T. Harvey Johnston, M.A., D.Sc., Hon. Zoologist, Queensland Museum; and M. J. Bancroft, B.Sc., Walter and Eliza Hall Fellow in Economic Biology, University, Brisbane.

(With 48 Text-figures.)

During our experimental work with Diptera as possible transmitting agents of certain worm parasites of horses and stock[1] we used a number of species of flies found associated with these animals, some of them being either insufficiently described or apparently undescribed. We have already dealt with a few of these flies (Johnston and Bancroft, 1919) and now propose to give an account of certain others which, as far as available literature allows us to judge, belong to undescribed species of *Musca*.[2]

We desire to express our appreciation of the assistance given by Dr. E. W. Ferguson, Health Department, Sydney; Mr. W. W. Froggatt, Government Entomologist, Sydney; Dr. A. B. Walkom, Linnean Society, Sydney; and Mr. W. A. Rainbow, Australian Museum, Sydney. Typical specimens have been deposited in the Queensland Museum, Brisbane, and in the Australian Museum, Sydney.

MUSCA TERRÆ-REGINÆ n. sp.

(Text-figs. 1, 2, 9, 10, 15, 17, 18, 27, 28, 31, 37, 38, 41, 42, 43, 44, 45.)

This is a rather small fly about 4·5 mm. in length, which has been taken occasionally on stock in the Eidsvold district and is referred to in our previous paper (1919, p. 182) as *Musca* sp. indet.

MALE.

Head (*fig. 9*).—One is struck with the relatively enormous size of the eyes which occupy more than three quarters of the front of the head. They are separated from one another by a narrow frontal stripe bounded by numerous rather short chætæ. The ocellar triangle is not very prominent and bears about four pairs of short ocellar bristles. Behind the triangle there is on each side a prominent vertical bristle, with a shorter one adjacent to it. The facial region is practically triangular in outline. The silvery parafrontals do not extend upwards between the eyes except as a thin black line on either side between the frontal stripe and each eye. The characters of the silvery-grey antennæ are shewn in fig. 31.

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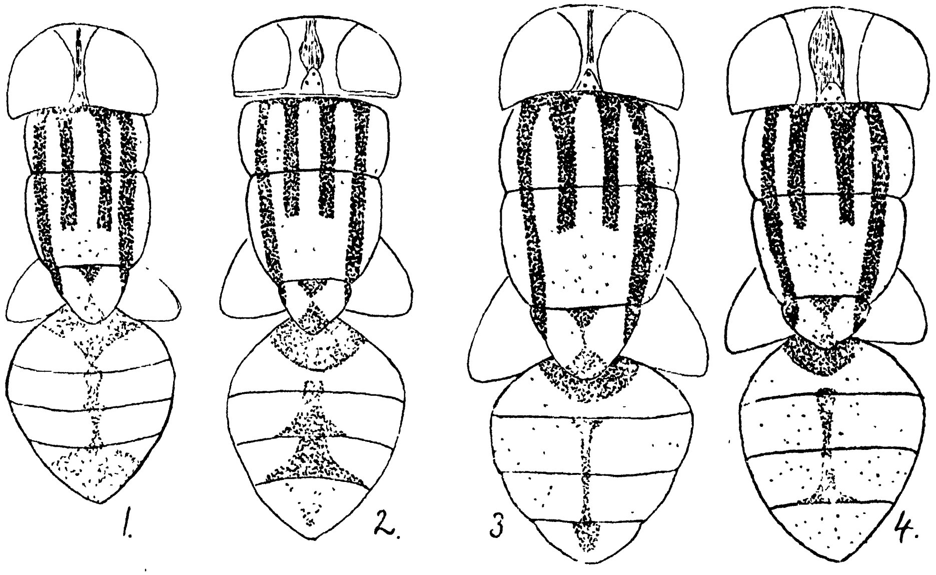
[1] Johnston and Bancroft, The Life History of *Habronema* in relation to *Musca domestica* and native flies in Queensland, P.R.S. Q'land, 1920.

Johnston and Bancroft, Experiments with certain Diptera as possible transmitters of bovine *Onchocerciasis*, P.R.S. Q'land, 1920.

[2] Unfortunately for us Professor M. Bezzi's excellent key deals only with African and Mediterranean species of *Musca* (Miodarii Superiori raccolti dal Sign C. W. Howard nell Africa australe orientale—Boll. Lab. zool. gen. agr. d. R. Scuola Sup. d'Agric. Portici, 6, 1912, Keys pp. 85-88).



Text-figs. 1-4.—*Camera lucida* drawings to show dorsal colouration. All figs. drawn to same scale. Fig. 1, *Musca terræ-reginæ* male; 2, *M. terræ-reginæ* female; 3, *M. hilli* male; 4, *M. hilli* female.

Thorax (*fig. 1*).—When viewed with the light falling from the front the thorax is black and shiny, but when viewed from the opposite quarter the general effect is dark greyish.[3] There are four longitudinal stripes, the two outer extending backwards to the sides of the scutellum whilst the two inner extend only to the middle of the scutum. The central silver-grey stripe is rather broader and in individuals of either sex may extend much further forward than the others. The black stripes of each side fuse anteriorly. The posterior half of the midregion of the scutum is rather darker than the other portions. On the anterior part of the scutellum there is a prominent black marking followed by a well-defined smoky patch extending to the hind margin of the scutellum. The chætotaxy is shewn in fig. 15.

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[3] The accompanying descriptions of the thorax and abdomen of each species are based on specimens with the head towards the observer and with the source of light opposite the observer.

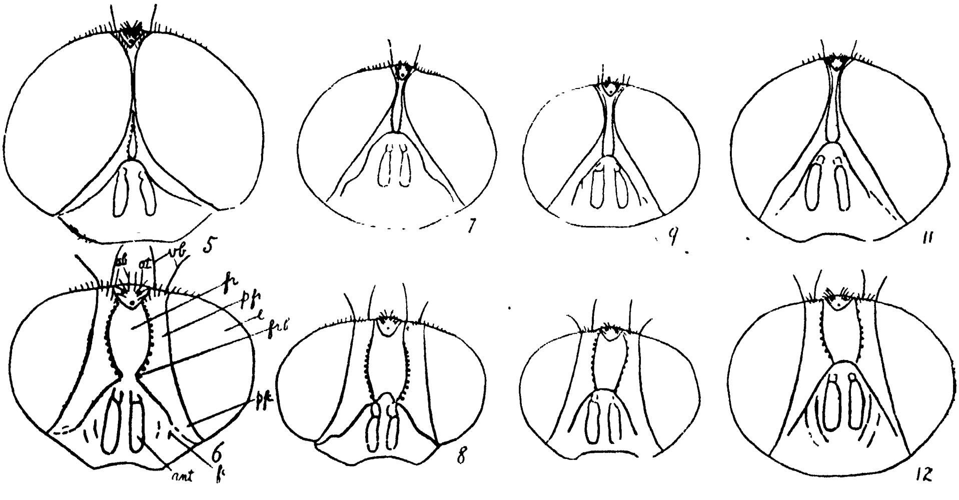
Wings.—The veins are yellowish brown. The venation is shewn in fig. 17. The squame is pale yellow.

Legs.—The tarsus of the third leg is figured in fig. 27.

Abdomen.—The abdomen is pale yellow with a median dorsal band, the intensity of whose colouration is interrupted in places so that there appears a succession of light-brown and dark-brown markings. The colouration extends to the anterior half of the first abdominal segment[4] where it is rather dark brown. Laterally on each segment there is a patch of darker yellow (fig. 1).

FEMALE.

Head.—The main external difference between the male and female is in the size of the eyes which in the female are separated (where they most closely approximate) by about a third of the width of the head (fig. 10), whereas the minimum distance is about one twenty-fifth in the male. The silvery parafrontals extend upwards between the eyes as a fairly broad band separated by the very shallow smoky-coloured frontal stripe. There are two prominent vertical bristles on either side behind the eyes. The ocellar triangle does not project and the ocellar bristles are short.



Text-figs. 5-8.—*Camera lucida* outlines of face views drawn to same scale to show relationship of eyes, frons, etc. Fig. 5, *M. australis* male; 6, *M. australis* female; 7, *M. vetustissima* male; 8, *M. vetustissima* female; 9, *M. terræ-reginæ* male; 10, *M. terræ reginæ* female; 11, *M. hilli* male; 12, *M. hilli* female. Lettering as in preceding figures—*ant.*, antenna; *e.*, eye; *fr.*, frons or frontal stripe; *fr.b.*, frontal bristles, *fc.*, facialia; *o.b.*, ocellar bristle; *o.t.*, ocellar triangle: *p.fc.*, parafacialia; *p.fr.*, parafrontalia; *v.b.*, vertical bristles.

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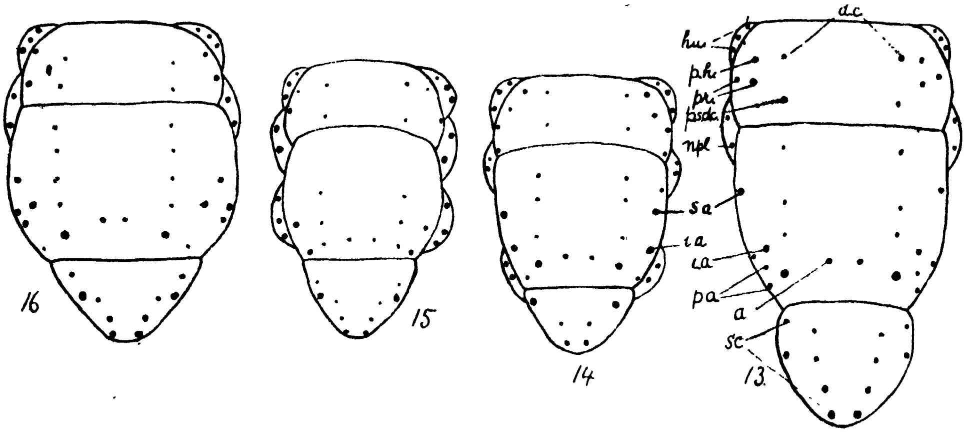
[4] The terms 1st to 4th are applied to the obvious abdominal segments—*i.e.*, the reduced first segment is not taken into account as a separate one but is considered as a part of the second with which it is fused, the two together being dealt with as the first segment.

Thorax.—The thorax is similar to that of the male (fig. 2). The form of the last tarsus is shown in fig. 28.

Wings.—As in the case of ***M. hilli*** there are slight differences in the sexes in regard to the wing, particularly in the region of the first posterior cell and the posterior cross-vein (fig. 18).

Abdomen (fig. 2).—The general colour is yellow with a brown median dorsal stripe, rather broad on the anterior portion of the first segment and more or less interrupted in the middle portion, but on the posterior region of that segment the colouration makes its reappearance extending on to the succeeding segment and widening to form a large dark-brown blotch of more or less triangular outline. A similar patch of colour occurs on the succeeding segment and is continued on to the fourth. Faint shimmering whitish patches occur laterally towards the posterior end of the abdomen. The under surface is yellow.



Text-fig. 13, Outlines of thorax (dorsal) to show chætotaxy; *M. australis*; 14, *M. vetustissima*; 15, *M. terræ-reginæ*; 16, *M. hilli*. Lettering—*a.*, acrostichal (inner dorsocentral); *d.c.*, dorsocentral; *hu.*, humeral; *i.a.*, intra-alar; *npl.*, notopleural; *p.a.*, postalar; *p.h.* posthumeral; *pr.*, presutural; *p.s.d.c.*, presutural dorsocentral; *s.a.*, supra-alar; *sc.*, scutellar.

Breeding Habits.—The eggs are laid in cowdung or horsedung, each egg measuring about 1 mm. in length by ·25 mm. in breadth, being very similar to that of the house-fly. In less than twenty-four hours the eggs hatch, the larvæ being in the first instar (fig. 42). Twenty-four hours later the first moult occurs; the anterior spiracles each with six or seven processes appear (fig. 45), while the posterior spiracles are in the form of two almost straight slits (fig. 43). The second instar also lasts about twenty-four hours. In the third instar the posterior spiracles take the form of three sinuous slits surrounded by a black chitinous D-shaped ring (fig. 44). The mature larvæ are creamy white and measure 9 to 10 mm. in length by 1·5 mm. in breadth. They leave the dung and pupate in damp sand under laboratory conditions. The puparium is reddish brown and measures 4 to 5 mm. by 1·5 to 2 mm. The larval stage lasts from 5 to 7 days, and the pupal from 7 to 10 days, the total thus being from 12 to 17 days during midsummer (Eidsvold, Burnett River), which is similar to that of the house-fly.

In bred flies the males were usually slightly in excess of the females, about 51 per cent. being males and 49 per cent. females. When bred flies of both sexes were kept together in a small cage and fed on raisins, honey, &c., copulation was observed to take place in from 5 to 9 days after emergence (midsummer observations), while the females were ready to oviposit about five days later.

The female genitalia (fig. 41) closely resemble those of the house-fly, except that the number of ovarian follicles is less, the maximum number detected in each ovary being thirty-five.

Parasites.—*M. terræ reginæ* was found to be parasitised by a flagellate, *Herpetomonas* (probably *H. muscæ-domesticæ* Burnett), and by three larval nematodes (*Habronema muscæ* Carter, *H. megastoma* Rud, and *Agamospirura muscarum* Jnstn. and Bancr.).

The following observation may be of interest as it allows one to compare the various periods taken by the three flies *M. terræ-reginæ*, *M. vetustissima*, and *M. domestica* to pass through their larval stages in horsedung, since all were under similar conditions, being bred in material from the same source and collected at the same time (November, 1919, Eidsvold) :—

——	Musca terræ-reginæ.	M vetustissima	M. domestica.
Eggs deposited	November 13th	14th	14th
Hatched as first instar	November 14th	15th	15th
Second instar	November 15th	15th and 16th	16th
Third instar	November 16th, 17th	17th	17th
Mature larva	November 18th, 19th, and 20th	18th and 19th	20th and 21st
Larval stages	5 to 7 days	4 to 5 days	6 to 7 days
Emergence—			
25.11.9		2 males, 2 females	
26.11.9		2 males, 5 females	
27.11.9	2 males, 3 females	9 males, 2 females	
28.11.9	Few—both sexes		
29.11.9	Few—both sexes		A few
30.11.9	1 male, several females		A few
Pupal stage	8 to 11 days	7 to 9 days	9 to 10 days
Total period for larval stages (egg to imago) approximately	13 to 18 days	11 to 14 days	15 to 17 days

MUSCA HILLI n. sp.

(Text-figs. 3, 4, 11, 12, 16, 19, 20, 29, 30, 32, 39, 40, 46, 47, 48.)

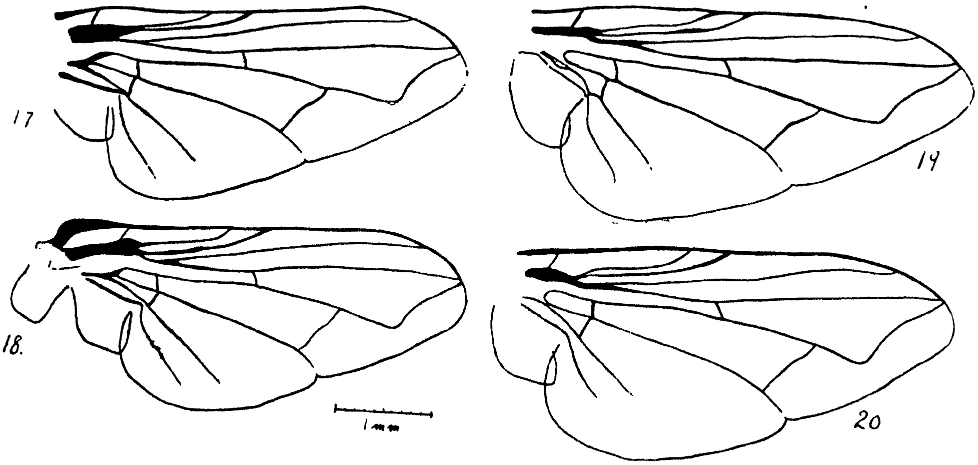
This is an outdoor species which is occasionally found on horses and cattle in Eidsvold and also in Brisbane. We have also seen it at Tweed Heads, N. S. Wales (March, 1920). The average length of full-grown specimens of either sex is about 6 mm.

MALE.

Head.—The eyes occupy the greater part of the front view and are contiguous for a considerable distance (fig. 11), separated only by a very narrow frontal stripe. The ocellar triangle is elongate and narrow, projects prominently, and bears about four pairs of ocellar bristles. The parafrontals are wide and silvery. The frontal stripe is narrow and brownish.

The antennæ are smoky in colour. The form of the arista is shewn in fig. 32. There are two prominent bristles, also a shorter third one, on the second joint of the antenna.

Thorax (*fig.* 3).—When lighted from the anterior end the general effect is black and shiny, but when viewed from the opposite quarter four distinct stripes are to be seen separated by narrow greyish zones. The outer stripes extend from the anterior portion of the thorax to the end of the scutum and on to the anterior corners of the scutellum. The two inner stripes extend from the anterior end of the prescutum to about the midregion of the scutum where they merge into a rather smoky colouration occupying the middle and posterior part of the scutum between the longitudinal stripes. The four stripes are of approximately equal width and are each rather narrower than the central silvery stripe. The two dark stripes of each side are joined up by a black band anteriorly, somewhat as in *M. fergusoni.* The posterior end of the scutellum is smoky, this colouration becoming intensified so that at the anterior end the scutellum is practically black. The chætotaxy is indicated in fig. 16. It might be mentioned that the scutellum is very hairy, the setæ being particularly well developed and the macrochætæ quite long,



Text-fig. 17, Wings drawn to same scale; *M. terræ-reginæ* male; 18, *M. terræ-reginæ* female; 19, *M. hilli* male; 20, *H. hilli* female.

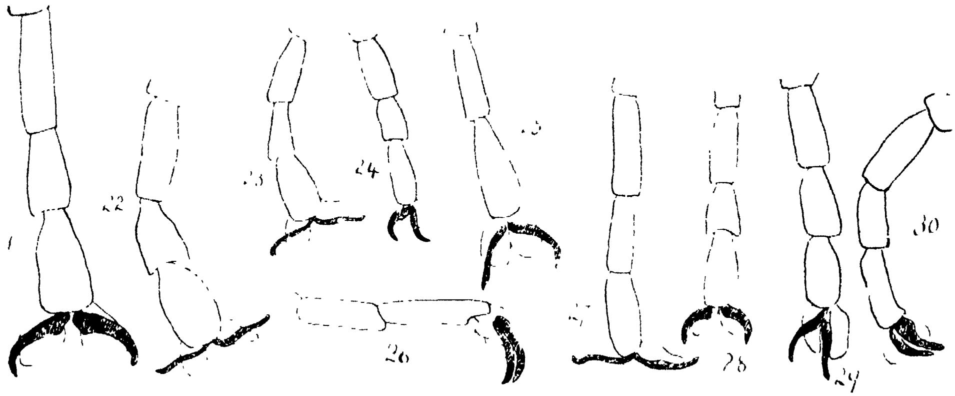
Wings.—The wings are clear, the veins yellowish brown. The venation is indicated in fig. 19. To the naked eye the squame appears opaque and somewhat pearly.

Legs.—The characters of the tarsi of the third leg are shewn in fig. 29.

Abdomen (*fig.* 3).—The fly can be very readily distinguished from *M. vetustissima* and *M. fergusoni* by the pale-yellow abdomen in both sexes. There is dorsally a median narrow brownish stripe, interrupted in the middle of the first abdominal segment. It is more pronounced in some individuals than in others, being occasionally reduced to a brownish blotch on the posterior edge of each segment. Whitish reflections are visible posteriorly and postero-laterally. The abdomen is well provided with long chætæ. The ventral surface is pale yellow with brownish colouration in the vicinity of the genital aperture.

FEMALE.

Head (*fig.* 12).—The head of the female differs from that of the male in the following particulars:—The eyes are widely separated, the distance between them, where they approach most nearly, being about a third of the total width



Text fig. 21. Tarsi of third leg—final segments only—all drawn to same scale, *M. australis* male; 22, *M. australis* female; 23, *M. vetustissima* male; 24, *M. vetustissima* female; 25, *M. domestica* male (for comparison); 26, *M. domestica* female; 27, *M. terræ reginæ* male; 28, *M. terræ-reginæ* female; 29, *M. hilli* male; 30, *M. hilli* female.

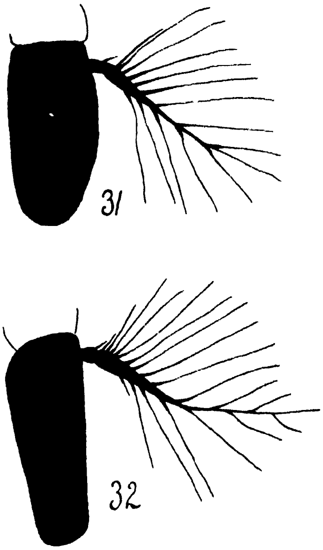
of the head, whereas in the case of the male it is about one thirtieth. There is a broad shallow dusky frontal stripe bounded by strongly incurving fronto-orbital bristles. On each side of the stripe is a fairly wide parafrontal which, as in the case of the male, is silvery.

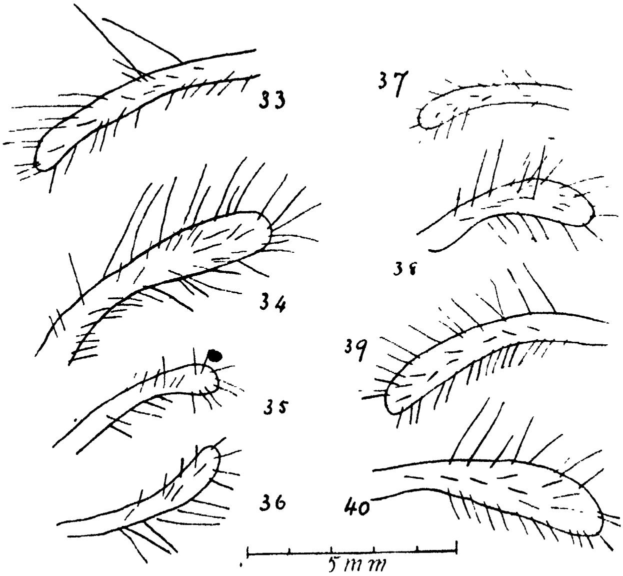
Thorax (*fig.* 4).—The female thorax has much the same characters as the male.

Wing.—The wing (fig. 20) differs from that of the male in the shape of the first posterior cell (fifth radial) and also in the form of the elbow of the fourth longitudinal vein (M. 1 + 2) and its relation to the posterior cross-vein (mediocubital).

Abdomen (*fig. 4*).—When viewed from certain points the abdomen appears to possess shimmering white patches, this being of course due to the arrangement of the tiny hairs. Ventrally the colour is pale yellow, there being only a faint brownish tint around the genital opening.

Breeding Habits.—The breeding habits of this fly resemble those of the preceding species, the small white eggs, which measure approximately the same as those of *M. terræ reginæ*, being laid in cowdung or horsedung. The successive instars occupy about the same periods. The posterior spiracles of the second and third instars are quite typical (figs. 46, 47). The anterior spiracles contain from 4 to 7 processes (fig. 48). The mature larva measures from 10 to 12 mm. The larval stage occupies from 5 to 6 days, the pupal 6 to 9 days—a total of 11 to 15 days (January and February, Eidsvold and Brisbane). The puparium is red-brown to deep chocolate and measures about 6 mm. in length by 2·7 mm. in breadth. The female genitalia are very like those of the preceding species (fig. 41), the maximum number of follicles observed in each ovary being, however, slightly larger, viz., about 40.

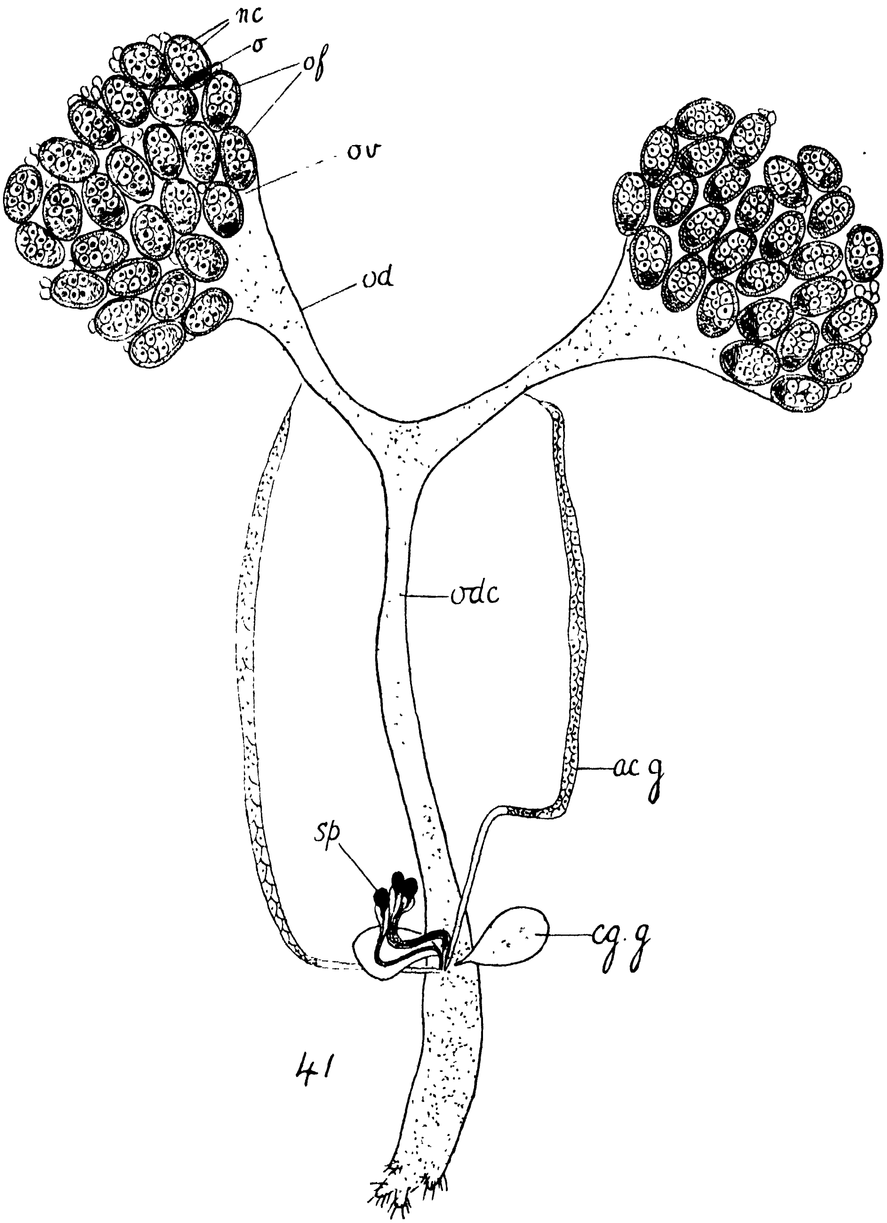




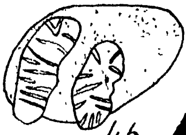
Text-fig. 31, Aristæ of females, *M. terræ-reginæ*; 32, *M. hilli*.

Text-fig. 32, Palps (all to same scale) drawn from mounted specimens, *M. australis* male (fig. 33) and female (34); *M. vetustissima* male (fig. 35) and female (fig. 36); *M. terræ-reginæ* male (fig. 37) and female (fig. 38); *M. hilli* male (fig. 39) and female (fig. 40).

The fly can be readily distinguished from *Musca pumila* by the colouration of its abdomen (Macquart, Dipt. Exot. Suppl. 3, 1847, p. 58). It appears to be more closely related to *Musca minor* (Macquart, l.c. Suppl. 4, 1850, p. 253)



Text-fig. 41, Genitalia of female *M. terræ-reginæ.* Lettering: *ac.g.*, accessory gland; *c.g.g.*, conglobate gland; *n.c.*, nurse cells; *o.*, ovum; *o.d.*, oviduct; *od.c.*, common oviduct; *o.f.*, ovarian follicles; *ov.*, ovary; *sp.*, spermatheca.



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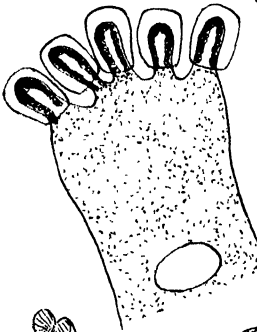

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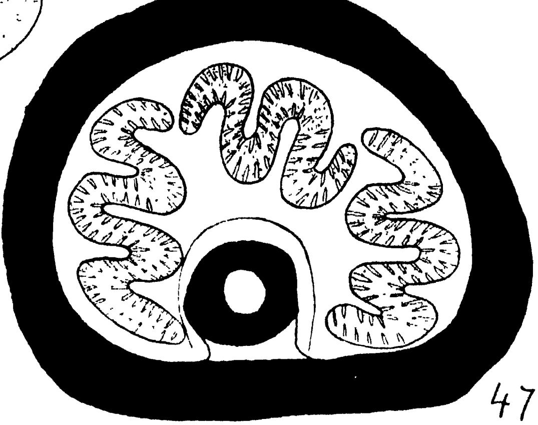

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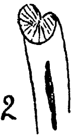

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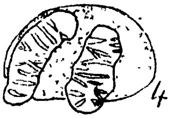

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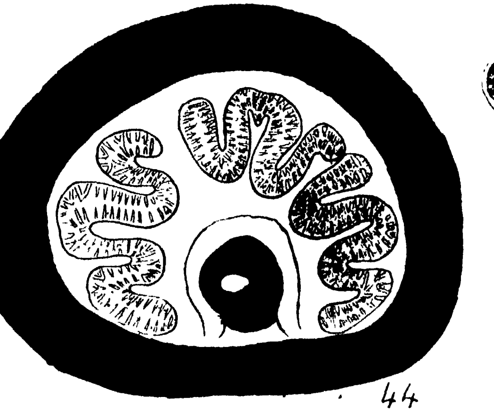

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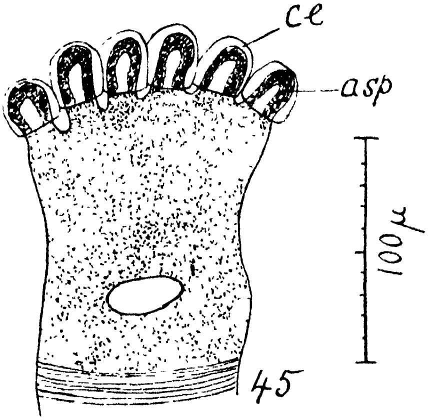

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Text figs. 42-44, Larval spiracles, all drawn to same scale. Posterior spiracles of *M. terræ-reginæ*; first instar (42), second instar (43), third instar (44).

Text fig. 45, Anterior spiracle of third instar of *M. terræ-reginæ*.

Text-figs. 46-48, Spiracles of larva of *M. hilli*: fig. 46, posterior spiracle of second instar; 47, posterior spiracle of third instar; 48, anterior spiracle of third instar. *a.sp.*, anterior spiracular process, surrounded by a clear envelope (*c.e.*).

from Tasmania, but in view of the brevity of the description, particularly in regard to the thoracic and abdominal markings, we do not feel justified in identifying our form with his. We have pleasure in associating with this new species the name of Mr. G. F. Hill, Entomologist to the Australian Institute of Tropical Medicine, Townsville, North Queensland, who has published important papers dealing with Australian flies.

Parasites.—*M. hilli* readily becomes parasitised by the nematodes *Habronema muscæ* and *H. megastoma.*

EUMUSCA VETUSTISSIMA (Walker).

(Text-figs. 7, 8, 14, 23, 24, 35, 36.)

Townsend (1915) stated that the type of the genus *Musca*—so designated by Latreille is *M. vomitoria* L., a blowfly which was transferred to *Calliphora*; and that the latter generic name fell into synonymy, a new name being required for the species usually placed under *Musca.* He accordingly erected the genus *Promusca* (p. 434) with *M. domestica* L. as its genotype. He had previously (1911, p. 170) separated off certain species making *M. corvina* Fabr. the type of *Eumusca.*

The characters of *Musca vetustissima*, which have already been described by us (J. and B., 1919), agree with most of those given by Townsend (1915, p. 435) but differ in certain important respects—*e.g.*, (1) the eggs, though macrotype, are not stalked; (2) the puparium is red-brown like that of the house fly; and (3) copulatory vesicles are present in the female. The species thus occupies a position between *Promusca* and *Eumusca*, more nearly approaching the latter genus of which it may perhaps be regarded as an atypical member, otherwise a new genus would need to be erected for its reception.

In our previous account we did not refer to the chætotaxy which is now figured (fig. 14). There are two weak dorsocentrals on either side in front of the suture. The presutural and posthumeral are rather strongly developed. Postsuturally there are four dorsocentrals, only the last being strong. Three pairs of scutellar macrochætæ are present, two pairs being well developed. The vertical bristles behind the eyes are arranged as in *Musca domestica.*

The palp of the two sexes are shown in figs. 35 and 36 and the tarsus of the third leg in figs. 23 and 24.

In our earlier account (1919, fig. 5) we omitted to indicate in our figure that the fourth abdominal segment (*i.e.* true fifth) of the male possessed a dark colouration

Dr. Cumpston, Director of the Federal Quarantine Service, informed us that he had observed the common Western Australian bush-fly (*M. vetustissima*) copulating thirty-six hours after emergence. He used a rather large cage measuring about 6 by 6 by 8 feet for his observations.

VIVIPAROMUSCA FERGUSONI J. and B.

(Text-figs. 5, 6, 13, 21, 22, 33, 34.)

This species was described last year (J. and B.) as *Musca fergusoni.* If Townsend's genus *Viviparomusca* (1915, p. 435) be recognised then the relationships of this Northern Australian fly are rather with it than with *Promusca*

(*Musca* of authors). It differs, however, in several important points, viz.—(1) the larva is carried in the uterus to the *second* stage, not the third; (2) copulatory vesicles are present in addition to the accessory glands in the female. In regard to (1) we might point out that the two posterior spiracular slits of this instar are not straight but sinuous as they are in those of the third instar where there are three. Then again in the type species of the genus *M. bezzii* Patton, a larva is deposited, though in which stage mention is not made by Patton and Cragg (1913, p. 23). In *M. fergusoni* the larva is deposited while in an eggshell which at once bursts liberating it.

This fly appears to be very hairy on account of the presence of well-developed macrochætæ on the dorsal part of the thorax. Many of the scutellar bristles are very strong and are practically macrochætæ. The arrangement is shown in fig. 13. The vertical pairs between the eyes are strong. The ocellar bristles are weakly developed in both sexes, especially in the male where they are practically absent.

The form of the tarsi and claws of the third leg in the two sexes is shown in figs. 21 and 22. The palps bear very strong setæ in both sexes, especially in the male (figs. 33, 34).

OTHER FLIES.

In our earlier paper (1919, p. 182) we referred to the presence of certain other flies in the Eidsvold district. The cobalt-blue species therein indicated as *Lasiopyrellia* is a *Pseudopyrellia,* according to Williston's Key to the North American genera (1908), while the very small fly which was regarded as being probably a *Pseudopyrellia* falls within the genus *Pyrellia.* It was mentioned that both of these metallic flies frequented cowdung for oviposition. So also does a rather handsome large blowfly which Mr. W. W. Froggatt has identified for us as *Stenopterina gigas* Macq. A tiny species of *Sepsis* is very commonly found frequenting similar material and breeds in it. Patton and Cragg (1913*b*, p. 310) refer to its presence in India.

Muscina stabulans has been bred out of rotting potatoes received at Eidsvold from elsewhere and no doubt the fly is occasionally to be met with in the township.

Amongst the Anthomyidæ occurring there one might mention that *Phaonia personata* Walker, which at first sight somewhat resembles a large greyish or bluish long-winged house-fly, is to be found in the vicinity of rotting fruit and has been bred out from that material.[5] Mr. Froggatt (1907, p. 311) who kindly identified the species and also the one next mentioned, informed us that it occurred commonly in fruit-shops in Sydney. *Sapromyza fuscicornis* Macq., a fairly large fly (Sapromyzidæ) with a striped thorax and a dark head, has been bred from horsedung (Eidsvold).

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[5] *See also* W. B. Gurney. Fruit-flies and other insects attacking cultivated and wild fruits in N. S. Wales—Farmers' Bulletin, No. 55, July, 1912, Dept. Agric. N. S. Wales, p. 29; and in Agric. Gaz. N. S. Wales, January 1912 (pp. 75-80).

LITERATURE QUOTED.

1907. FROGGATT, W. W. Australian Insects, Sydney, 1907.

1919. JOHNSTON, T. H., and BANCROFT, M. J. The life histories of ***Musca australis*** and ***M. vetustissima,*** P.R.S., Q'land, 31, 1919, pp. 181-203.

1913. PATTON, W. S., and CRAGG, F. W. Hæmatophagous species of the genus ***Musca.*** Ind. Jour. Med. Res. 1 (1), 1913, pp. 11-25.

1913*b*. PATTON, W. S., and CRAGG, F. W. A textbook of Medical Entomology.

1911. TOWNSEND, C. H. Review of work by Pantel and Portschinsky on reproductive and early stage characters of Muscoid flies. Proc. Ent. Soc. Washington, 13, 1911, pp. 151-170.

1915. TOWNSEND, C. H. Correction of the misuse of the generic name *Musca,* with a description of two new genera. Jour. Wash. Acad. Sci. 5 (12), 1915, pp. 433-6.

1908. WILLISTON, S. W. Manual of North American Diptera, edit. 3, London.

THE OCCURRENCE IN BRISBANE RIVER OF THE NEW ZEALAND AMPHIPOD, *PARACOROPHIUM EXCAVATUM* (G. M. THOMSON).

BY CHAS. CHILTON, M.A., D.SC., M.B., C.M., LL.D., F.L.S., C.M.Z.S., HON. MEMBER ROY. SOC. N.S.W., PROFESSOR OF BIOLOGY, CANTERBURY COLLEGE, NEW ZEALAND.

(With Text-figures Nos. I to XIX.)

TOWARDS the end of 1918, I received from Professor T. Harvey Johnston, of the University of Queensland, and honorary Zoologist to the Queensland Museum, a few Crustacea from Brisbane River, sent chiefly because of the boring Isopod, *Sphæroma terebrans* Bate, which was doing considerable destruction in timber immersed in the water. Among the specimens, however, were numerous examples of a small amphipod evidently belonging to *Corophium* or some allied genus. The male of this species first attracted my attention because of the character of the second gnathopod and the possession of a lobe on the inner side of the end of the penultimate joint of the peduncle of the lower antenna. Later on when I came to examine the females, which differed in the structure of the second gnathopod and in having no lobe on the antenna, I was struck by their resemblance to the descriptions of *Paracorophium excavatum* (G. M. Thomson), an amphipod found in brackish waters of New Zealand. In that species no sexual differences had hitherto been described. However, I found on closely examining specimens in my collection that there were some males among them having the characters of the second gnathopod and the lobe on the lower antenna quite similar to those of the Brisbane specimens, and careful comparison shows conclusively that the Brisbane specimens belong to the same species as the New Zealand. I take this opportunity of giving a fuller account of the species than has hitherto been published and of describing the differences between the male and the female.

Paracorophium excavatum was described by Mr. G. M. Thomson in 1884, under the name *Corophium excavatum*, from specimens obtained in Brighton Creek, near Dunedin, the water of which he described as being salt. A little later I received some specimens from Napier, and in January, 1890, I collected a number at Brighton itself at a time when the water in the estuary was nearly fresh or only slightly brackish; in 1894 I obtained a few specimens from Nelson, also in brackish water. In 1902 Messrs. Lucas[1] and Hodgkin obtained specimens from Lake Roto-iti (fresh water) in Auckland which I afterwards identified as belonging to the same species.[2] The Brisbane specimens now to be described also come from brackish water, and the occurrence of this species, which is apparently confined to brackish and fresh waters, in Australia as well as in New Zealand, is of some importance in connection with the general question of the geographical distribution of New Zealand and Australian Amphipoda.[3]

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[1] Keith Lucas, A Bathymetrical Survey of the Lakes of New Zealand, Geographical Journal for May and June, 1904.

In 1899 Stebbing established the genus *Paracorophium* for the reception of the species now under consideration, which is the only one of the genus at present known.

PARACOROPHIUM Stebbing, 1899.

Paracorophium Stebbing, 1899, Ann. Nat. Hist., ser. 7, vol. 3, p. 350; 1906, Das Tierreich Amphipoda, p. 663.

In general appearance and in most of the appendages *Paracorophium* comes close to *Corophium*, the chief points of difference being—(1) The mandible has the palp well developed and three-jointed, (2) the second gnathopod of the male is markedly different from that of the female and in both sexes has the merus produced into a scoop-like process different from that in *Corophium*, (3) the third uropoda are two-branched.

PARACOROPHIUM EXCAVATUM (G. M. Thomson)

Corophium excavatum G. M. Thomson, 1884, Trans. N. Z. Inst., vol. 16, p. 236, pl. 12, fig. 1 to 8
Paracorophium excavatum, Stebbing, 1906, Das Tierreich Amphipoda, p. 664.
Paracorophium excavatum, Chilton, 1906, P.Z.S., p. 704.

As this is the only species of the genus it is unnecessary to give a separate specific diagnosis. Thomson's original description and figures, on which that in Das Tierreich Amphipoda appears to be based, apply to an immature male. A detailed description is given below.

Size.—About 4 mm. in length.

Colour.—Greyish.

Localities.—New Zealand—Brighton, Napier, Nelson (brackish water), and Lake Roto-iti (fresh water); Australia—Brisbane River (brackish).

Antenna 1 (fig. 1) has the second joint of the peduncle longer than the first but much more slender; the third about half the length of the second;

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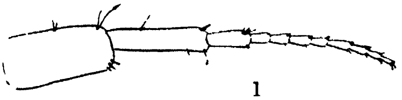
[2] P.Z.S. 1906, p. 704.

[3] Several of the Corophiidæ appear to be able to live in brackish or fresh water. Speaking of the whole family Stebbing says (1906, p. 662), "Marine, but extending into brackish or even almost fresh water"; and of *Corophium crassicorne* Bruz. he says, "Found in Norfolk in almost fresh water." *C. volutator* is recorded as "forming tubular galleries in the mud of tidal swamps." I have specimens of this species obtained for me by Mrs. Sexton, of Plymouth, labelled "Mouth of Issel, near Kampen. Quite fresh water"; and Mr. Robert Gurney, speaking of this species under the name "*C. grossipes* (Linn.)," says "it seems to thrive well in fresh water" (Trans. Norfolk and Norwich Naturalists' Soc., vol. viii, p. 435, 1907). Later on he recorded it as found in the Oued Tindja at its outflow from Lake Garaa Achkel in Tunisia (Jour. Roy. Micr. Soc. 1909, p. 283).

flagellum shorter than the peduncle, containing about 10 joints. This appendage appears to be the same in the male and in the female.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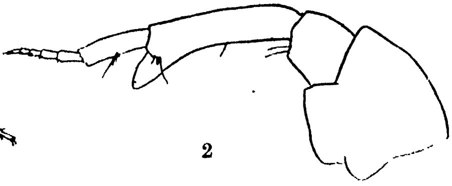
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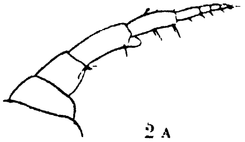
Fig. 1.—First antenna of male (Brisbane specimen).
Fig. 2.—Second antenna of male (Brisbane specimen).

Antenna 2 appears to vary considerably according to age and development, becoming stouter, especially at the base, in older specimens. In a fully developed male (fig. 2) the first three basal joints of the peduncle are short and very broad; the fourth joint is fully as long as all the preceding though much more slender, and is produced at the apex on the inner side into an oval lobe which when fully developed reaches nearly halfway along the fifth joint of the peduncle; the fifth is only half as long as the preceding; the flagellum is shorter than the last joint of the peduncle and consists of about 5 or 6 joints. The lobe at the end of the fourth joint of the peduncle varies in size in different specimens according to their development; in one specimen from Brighton, the second gnathopod of which is shown in figure 10*a*, the antennal lobe is quite short, the basal joints of the peduncle are not so broad and the fourth joint scarcely so long as in more mature specimens (fig. 2*a*). In a specimen from Lake Roto-iti which, judging by the second gnathopod, is an undeveloped male, the second antenna (fig. 2*b*) is very stout, the fourth joint being almost as stout as the preceding but without any trace of the apical lobe, while the fifth joint is larger in proportion than in the mature males from Brighton and from Brisbane. In some of the specimens the proximal joints of the flagellum appear to be partially fused though the line of junction is clearly visible; like the peduncle they bear a few fine setæ. In the females the second antenna remains much more slender and without the lobe on the fourth joint.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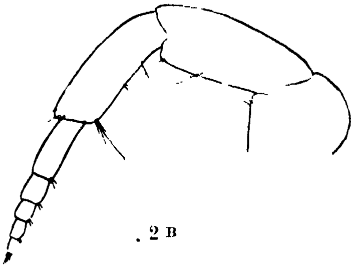
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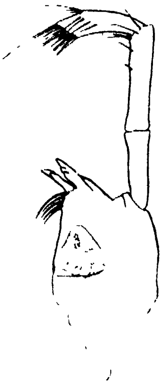
Fig. 2*a*.—Second antenna of male, immature (Brighton specimen).
Fig. 2*b*.—Second antenna of male, immature (Roto-iti specimen).

The antennal lobe being found only in the male probably has some sexual function, but being flat on the inner side it perhaps also facilitates the holding together of the right and left antennae as the animal swims backwards.

The *mandible* (fig. 3) is of normal structure with large molar tubercle, the cutting edge consisting in the left mandible (fig. 3) of 3 or 4 teeth, the accessory process being similar and of approximately the same size; the spine row contains about 5 spines. In the right mandible (fig. 4) the accessory process is narrower. The palp is large, second joint the longest with a small tuft of setæ at the distal end, third joint widens distally and bears numerous long setæ at the apex with a small tuft at a little distance from the apex which is obliquely truncate.

The *first maxilla* (fig. 5) has the inner lobe very small and delicate, triangular, and bearing a minute setule at the end. The outer lobe ends in about 7 to 9 dentate spines; the palp has the first joint slightly swollen, the second joint widens distally and bears at the apex 7 or 8 short setules.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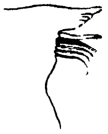
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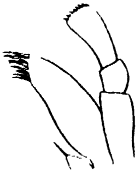
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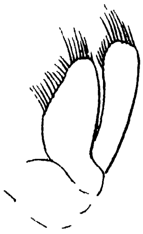
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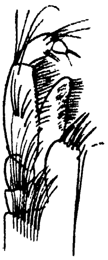
Fig. 3.—Left mandible, male (Roto-iti specimen).
Fig. 4.—Cutting edge of right mandible, male (Roto-iti specimen).
Fig. 5.—First maxilla, male (Roto-iti specimen).
Fig. 6.—Second maxilla, male (Roto-iti specimen).

The *second maxilla* (fig. 6) has the inner lobe shorter and broader than the outer and is fringed along its inner margin as well as at the rounded apex, in the outer lobe the long setæ are mainly confined to the apex.

The *maxillipeds* (fig. 7) have the inner lobe bearing at the apex 4 long setæ and several shorter ones, the outer lobe is somewhat narrow and reaches nearly to the end of the second joint of the palp, the inner margin is thickly fringed with setæ. In the palp the second joint is much the longest; the propod is oval, produced at the outer apex slightly beyond the base of the finger; the finger is about half as long as the propod; all the joints bear long setules as shown in the figure.

The *first gnathopod* (figs. 8 and 9) has the side plate large and subtriangular, projecting forwards, its anterior angle rounded and bearing a fringe of long setæ which extends also along the lower margin; the basal joint widens considerably distally and bears a few long setæ towards the apex; the ischium and merus are both short, their posterior margins bearing long setæ, those on the ischium reaching nearly to the middle of the carpus; the carpus is greatly elongated, being narrowly oblong in shape, its posterior margin densely fringed with a double row of long setæ, a few scattered ones being also found on the anterior margin; the propod is much shorter than the carpus, about the same width throughout, its palm nearly transverse, not defined, being closely overlapped by the dactyl; near the base of the propod is an oblique row or tuft of about 6 or 7 long setæ. This appendage seems to be the same in both sexes.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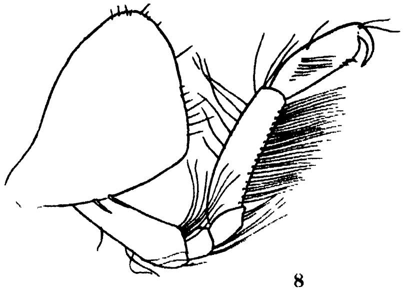
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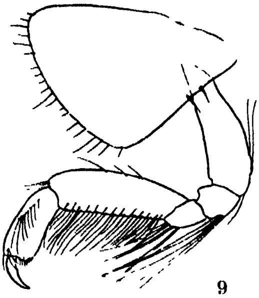
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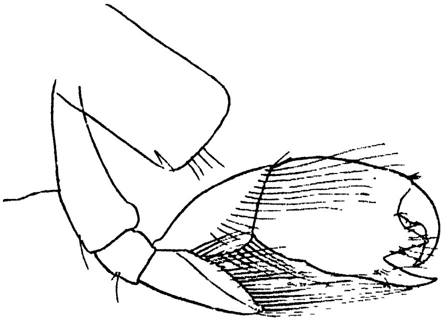
Fig. 7.—Maxilliped, male (Roto-iti specimen).
Fig. 8.—First gnathopod, male (Brisbane specimen).
Fig. 9.—First gnathopod, female (Brisbane specimen).

The *second gnathopod* in the fully developed male (fig. 10) is much stouter than in the female, the side plate is oblong with the inferior angles rounded, its inferior margin with a few long setæ; the merus is produced into a long scoop-like process reaching considerably beyond the end of the carpus which, together with the basal portion of the propod, appears to fit into the hollow of the scoop, one margin of which is fringed with very long setæ most of which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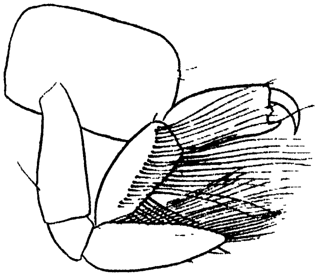
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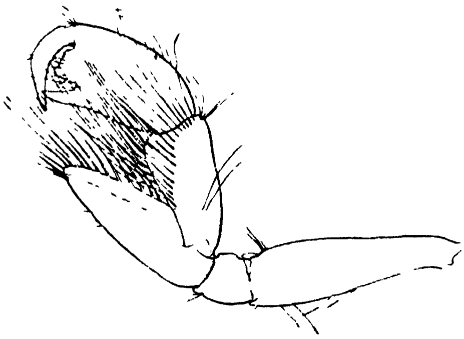
Fig. 10.—Second gnathopod, male (Brisbane specimen).
Fig. 10*a*.—Second gnathopod, male, immature (Brighton specimen).

reach quite to the end of the propod, the other (inner) margin being apparently free from setæ; the carpus is short, triangular in shape, widening greatly distally, its posterior border bears long hairs and there is an oblique row on the outer surface; the propod is oblong-oval, as wide at the base as the carpus, but becoming slightly wider distally; both anterior and posterior margins are convex, the posterior one being produced into a long slender curved tooth, separated by a deep depression from a similar but shorter tooth arising from the middle of the palm; the finger is short, not reaching quite to the end of the palm.

In the female the *second gnathopod* (fig. 11) has the scoop-like process on the merus as in the male, but differs greatly in the carpus and propod, both of which are much longer and more slender, as shown in the figure; the carpus is longer than the propod and has the posterior margin fringed with two widely separated rows of long setæ; the propod is slender and ends simply, being almost entirely without palm. In some cases the end of the propod is narrower than is shown in figure 11.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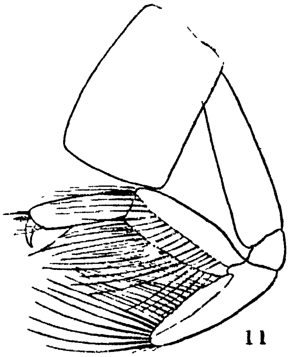
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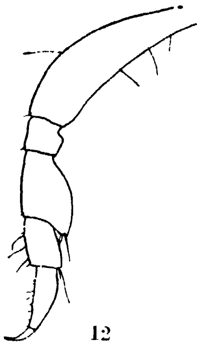
Fig. 10*b*.—Second gnathopod, male, immature (Roto-iti specimen).
Fig. 11.—Second gnathopod, female (Brisbane specimen).

In the young male the second gnathopod appears to be at first similar to that of the female, the adult male characters being gradually developed. Figure 10*b* shows an intermediate stage in which the carpus and propod, though broader than in the female, are still somewhat narrow; the propod has the posterior margin produced into a tooth only half the length it afterwards becomes, while the tooth in the centre of the palm is hardly yet apparent; the dactyl reaches slightly beyond the end of the palm in this case. This figure is drawn from a Lake Roto-iti specimen. I have a similar one mounted from Brighton (fig. 10*a*) in which the defining tooth of the palm is still shorter and the finger overlaps the palm as it does in the female.

The *first* (fig. 12) and *second peræopoda* are of normal shape and do not call for special description.

In the *third peræopod* (fig. 13) of fully developed animals the basal joint is very large and much produced posteriorly, the posterior margin being fringed with long setæ. The carpus bears at its postero-distal angle 4 strong curved spines with a similar tuft of 3 placed more proximally. Similar curved spines are found also on the propod and appear quite similar to those in several species of *Corophium*. In more immature specimens the basal joint is much narrower and only slightly produced posteriorly. That of the Roto-iti specimen whose second gnathopod is shown in figure 10*b* is represented in figure 13*a*. The third peræopod of an ovigerous female from Brisbane River is represented in fig. 14, which shows that it is very nearly the same as in the adult male.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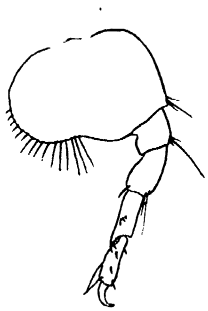
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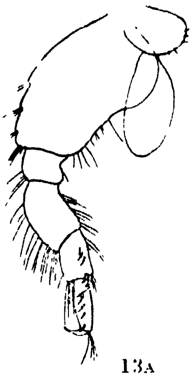
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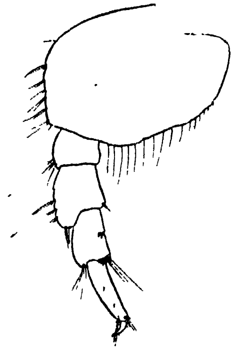
Fig. 12.—First peræopod, male (Brisbane specimen).
Fig. 13.—Third peræopod, male (Brisbane specimen).
Fig. 13*a*.—Third peræopod, male, immature (Roto-iti specimen).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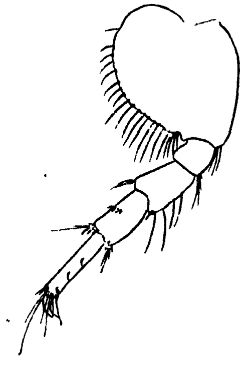
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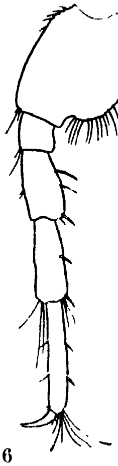
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Fig. 14.—Third peræopod, female (Brisbane specimen).
Fig. 15.—Fourth peræopod, male (Brisbane specimen).
Fig. 16.—Fifth peræopod, male (Brisbane specimen).

The *fourth peræopod* (fig. 15) is longer than the third, and has the basal joint broad but less produced posteriorly than in the third, its posterior margin fringed with long spinules; strong curved spines are found on the carpus and propod as in the third peræopod.

The *fifth peræopod* (fig. 16) is longer than the fourth, the basal joint is somewhat narrower, the merus, carpus and propod longer; the various joints bear stout setæ and some long hairs, but not the special groups of curved spines that are present in the third and fourth.

The *first uropod* (fig. 17 and 17*a*) has the peduncle considerably longer than the rami, its lower margin being produced between them into a flattened process, which when fully developed reaches nearly halfway to the end of the rami; this is shown in side-view in figure 17; in figure 17*a* it is shown as seen from above with a broadish base and the extremity forming a narrow vertical knife-edge; numerous short spines are present on the upper margins of the peduncle and of the rami.

The *second uropod* (fig. 18) is shorter, the outer ramus shorter than the inner, both rami and the peduncle bearing a few short stout spines on the upper margin.

The *third uropod* (fig. 19) has the outer ramus about twice as long as the inner, which bears a sharp spine on its inner margin and three long hairs at the apex; similar long hairs are found at the end of the outer ramus and at the end of the peduncle.

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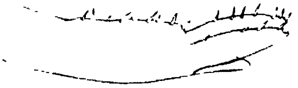

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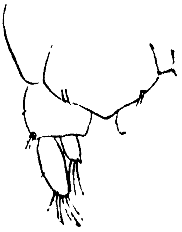

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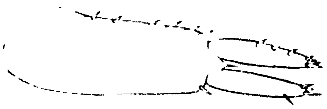

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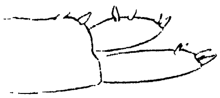

Fig. 17.—First uropod, male (Roto-iti specimen).
Fig. 17*a*.—First uropod, female (Roto-iti specimen).
Fig. 18.—Second uropod, female (Roto-iti specimen).
Fig. 19.—Third uropod and telson, female (Roto-iti specimen).

The *telson* (*see* fig. 19) has the posterior margin somewhat produced to a blunt triangular point, a pair of spinules being situated at each side at some distance from the extremity.

The specimens from Lake Roto-iti are larger than those from Brighton and Brisbane River and, as stated above, they differ in a few points, *e.g.* in the second antennæ of the male. It is possible that they may constitute a distinct variety, but I have not found among them a male as fully developed as those examined from the other localities, and in the meantime I consider the differences as being due to immaturity. In any case the differences are slight and do not seem to be of specific importance.

NEW OR LITTLE-KNOWN CRANE-FLIES IN THE QUEENSLAND MUSEUM
(TIPULIDÆ, DIPTERA).

By Charles P. Alexander, Ph.D., Urbana, Illinois, U.S.A.

Through the kindness of the Director, Mr. Heber A. Longman, the writer has been enabled to study the collections of crane-flies made in the vicinity of Brisbane by the Entomologist of the Queensland Museum, Mr. Henry Hacker. These collections, though not extensive, include many species of such interest that a special report is deemed necessary.

The types, which are preserved in alcohol, are returned to the Queensland Museum.

At this time, it is well to designate the genotypes of the numerous new genera of Australian crane-flies, proposed in 1889 and 1890 by Skuse:—

Triphana Skuse (subgenus of *Geranomyia*); Proc. Linn. Soc. New South Wales, vol. 4 (ser. 2), p. 777; 1889. Two species. Type, *Geranomyia* (*Triphana*) *lutulenta* Skuse, the first species, by present designation.

Tetraphana Skuse (subgenus of *Geranomyia*); l.c., pp. 780, 781. One species. Type, *Geranomyia* (*Tetraphana*) *fusca* Skuse, by monotypy.

Leiponeura Skuse (subgenus of *Gonomyia*); l.c., pp. 795, 796. Two species. Type, *Gonomyia* (*Leiponeura*) *skusei* Alexander (*gracilis* Skuse, preoccupied); the first species by designation of Alexander, Proc. U.S. Nat. Mus., vol. 44, p. 503; 1913.

Amphineurus Skuse (subgenus of *Ormosia*); l.c., pp. 800, 801. Two species. Type, *Ormosia* (*Amphineurus*) *umbratica* Skuse, the first species, by present designation.

Tasiocera Skuse; l.c., pp. 815, 816. Two species. Type, *Tasiocera tenuicornis* Skuse, the first species, by present designation.

Rhabdomastix Skuse; l.c., pp. 828, 829. One species. Type, *Rhabdomastix osten-sackeni* Skuse, by monotypy.

Lechria Skuse; l.c., pp. 830, 831. One species. Type, *Lechria singularis* Skuse, by monotypy.

Clytocosmus Skuse; Proc. Linn. Soc. New South Wales, vol. 5 (ser. 2), pp. 74-76; 1890. One species. Type, *Clytocosmus helmsi* Skuse, by monotypy.

Platyphasia Skuse; l.c., pp. 84, 85. One species. Type, *Platyphasia princeps* Skuse, by monotypy.

Plusiomyia Skuse; l.c., pp. 86, 87. Five species. Type, *Plusiomyia olliffi* Skuse, the second species, by present designation.

Habromastix Skuse; l.c., pp. 93, 94. Three species. Type, *Habromastix cinerascens* Skuse, the first species, by present designation.

Phymatopsis Skuse; l.c., pp. 97, 98. One species. Type, *Phymatopsis nigrirostris* Skuse, by monotypy.

Acracantha Skuse; l.c., pp. 109-111. Three species. Type, *Acracantha sydneyensis* Skuse, the first species, by present designation.

Ischnotoma Skuse; l.c., pp. 114, 115. Three species. Type, *Ischnotoma serricornis* Macquart, the first species, by present designation.

FAMILY TIPULIDÆ.

SUBFAMILY LIMNOBIINÆ.

TRIBE LIMNOBIINI.

GENUS LIMNOBIA Meigen.

1818. Syst. Beschreib., vol. 1, p. 116.
Limnobia bidentata Skuse.

1889 *Limnobia bidentata* Skuse; Proc. Linnean Soc. New South Wales, vol. 4 (ser. 2), pp. 782, 783.

The following records are included in the material at hand:—Brisbane, April 7, 1914 (H. Hacker). Caloundra, Sept. 30—Oct. 28, 1913 (H. Hacker). Sandgate, Jan. 24, 1914 (H. Hacker).

Skuse describes the radial sector as being only one-third longer than the deflection of $R4+5$; in the present material the deflection is proportionately longer but there are no other apparent differences.

TRIBE ANTOCHINI.

GENUS RHAMPHIDIA Meigen.

1830. Syst. Beschreib., vol. 6, p. 281.
Rhamphidia communis Skuse.

1889. *Rhamphidia communis* Skuse; Proc. Linnean Soc. New South Wales, vol. 4 (ser. 2), pp. 788, 789.

A few specimens in poor condition, from the following locality and dates:—Brisbane, July 30, 1914; September 16, 1918 (H. Hacker).

TRIBE ERIOPTERINI.

GENUS GNOPHOMYIA Osten Sacken.

1859. Proc. Acad. Nat. Sci. Philadelphia, p. 223.
Gnophomyia fascipennis (Thomson).
1869. *Limnobia fascipennis* Thomson; Eugenies Resa, Dipt., p. 447; ♀.
1887. *Gnophomyia cordialis* Osten Sacken; Berliner Ent. Zeitschr., vol. 31, pt. 2, p. 199; ♂.

There are numerous specimens of this very interesting fly from the following stations:—Brisbane, October 10-17, 1916 (H. Hacker); several. Sunnybank, near Brisbane, October 27, 1916 (H. Hacker). Caloundra, October 28, 1913 (H. Hacker). Stradbroke Island (H. Hacker).

The differences between the sexes of this fly are remarkable and quite unequalled in any other member of the genus.

GENUS CONOSIA van der Wulp.

1880. Tijdschr. v. Ent., vol. 23, p. 159, Pl. 10, figs. 5-7.
Conosia irrorata (Wiedemann).
1828. *Limnobia irrorata* Wiedemann; Aussereur. Zweifl. Ins., vol. 1, p. 574.

Several specimens from the following station and dates:—Brisbane, March 23, 1916; April 23, 1916; December 12, 1915 (H. Hacker).

This species is presumably of wider distribution than any other crane-fly, ranging from Australia to South Africa and northward to Japan.

TRIBE LIMNOPHILINI.

GENUS LECHRIA Skuse.

1889. Proc. Linnean Soc. New South Wales, vol. 4 (ser. 2), pp. 830, 831.

LECHRIA SUBLÆVIS sp. n.

Male.—Length, 6 mm.; wing, 6·6 mm.

Female.—Length, about 6·2 mm.; wing, 7·3 mm.

Generally similar to *L. rufithorax* Alexander (North Queensland), differing as follows:—

Rostrum, palpi, and antennæ brown; flagellar segments of the latter suboval to subcylindrical.

Mesonotum reddish brown, the three usual præscutal stripes entirely confluent, the lateral stripes continued back onto the lobes of the scutum. Halteres pale. Wings with the veins light brown, not so distinct as in *rufithorax*; the costal cell is scarcely darker than the remainder of the wing. Venation: *Rs* considerably longer, the section before *r–m* being about equal to the section of *M1+2* before *r–m*; the section of *Rs* beyond *r–m* longer than this crossvein; *Sc* ends opposite or before the end of *Rs*.

Male hypopygium similar to *L. rufithorax*, but the shape of the pleural appendages different; outer pleural appendage slender, gradually tapering to the acute, curved point, with scarcely any denticles on the inner face before the tip as in ***rufithorax***; inner pleural appendage more slender and more strongly arcuated.

Habitat: Queensland.

Holotype, ♂, Caloundra, September 30, 1913 (H. Hacker).

Allotopotype, ♀.

Type in the collection of the Queensland Museum.

The genotype of *Lechria*, *L. singularis* Skuse, differs from all the other species of the genus, as known, in that the radial crossvein connects with *R2+3* at its fork, in the other species connecting with *R2* some distance beyond the fork. Skuse interpreted the genus as having the vein *R1* ending in vein *R2+3* and the crossvein *r* lacking. The writer would interpret the venation as having the extreme tip of *R1* atrophied and the radial crossvein present but oblique in position and simulating a section of vein *R1*. These characters are found in many Cylindrotominæ, and it may be that *Lechria* belongs in the neighbourhood of this subfamily rather than in the tribe Limnophilini where it is now placed.

GENUS GYNOPLISTIA Westwood.

1835. London and Edinburgh Phil. Mag., vol. 6, p. 280.
Gynoplistia viridis Westwood.
1835. *Gynoplistia viridis* Westwood, London and Edinburgh Phil. Mag., vol. 6.

One male from Sunnybank, near Brisbane, October 27, 1914. One female from Brisbane, October 17, 1916 (H. Hacker).

SUBFAMILY TIPULINÆ.

TRIBE DOLICHOPEZINI.

GENUS DOLICHOPEZA Curtis.

1825. British Entomology, vol. 2, p. 62.

DOLICHOPEZA BREVIFURCA QUEENSLANDICA subsp. n.

Mesonotum reddish brown, the præscutum with three darker brown stripes; pleura yellow; legs light brown; wings pale brown, the stigma darker brown, an obliterative area before and beyond the stigma and across the inner end of cell *1st M2*; abdomen yellow, ringed with brown.

Male.—Length, 9-9·5 mm.; wing, 9·4-10 mm.; antenna, 4 mm.

Female.—Length, 9·4 mm.; wing, 9·3-10·3 mm.

Frontal prolongation of the head short, yellow; palpi pale brown, the long terminal segment whitish. Antennæ of the male moderate in length, light brown. Head brownish grey, especially on the vertex and occiput; front and genæ more yellowish.

Mesonotal præscutum reddish brown, with three darker brown stripes; scutal lobes marked with this same colour; remainder of the mesonotum yellow. Pleura yellowish. Halteres pale brownish yellow, the base of the knob darker. Legs with the coxæ and trochanters yellow; remainder of the legs light brown. Wings with a faint brownish tinge; cell *Sc* pale brown except at the distal end; an obliterative area before and beyond the stigma and another across the proximal end of cell *1st M2*; stigma large, subrectangular, brown; an indistinct brown cloud at the basal deflection of *Cu1*; veins pale brown, the tip of *Sc* and *R* below it yellowish. Venation: *Rs* transverse, about equal to *r–m*; cell *M1* rather short; vein *M1* about equal to *M1+2*; petiole of cell *M2* from one-half to two-thirds of *M1+2*; basal deflection of *Cu1* about its own length before the fork of *M*.

Abdomen yellowish, ringed with dark brown; on the second segment at about midlength, on the other segments appearing as a basal ring and a narrow ring on the posterior margin of the preceding tergite. Male hypopygium with the ninth tergite bidentate as in the Australian species of the genus; outer pleural appendages relatively short, about twice the length of the small, flattened, more complicated inner appendage; the proximal face of the outer appendage is indistinctly bidentate. Female ovipositor with the valves acicular.

Habitat: Queensland.

Holotype, ♂, Oxley, near Brisbane, September 4, 1914 (H. Hacker).

Allotopotype, ♀.

Paratopotype, ♂; paratypes, 5 ♀'s, Brisbane, May 23, 1916 (H. Hacker); a few dry fragments, Brisbane, September 18, 1914 (H. Hacker).

Type in the collection of the Queensland Museum.

The present form would seem to be a variety of *Dolichopeza brevifurca* Skuse, although the pleural appendages of the male hypopygium are very much smaller than in any other member of the subgenus *Apeilesis* that I have seen, agreeing more nearly with the normal type of the genus. The variety may be told from the typical form by the darker wings and the structure of the hypopygium.

TRIBE TIPULINI.

GENUS PTILOGYNA Westwood.

1835. Zoolog. Journ., vol. 5, pp. 448, 449.

Ptilogyna ramicornis (Walker).

1835. *Tipula ramicornis* Walker; Ent. Mag., vol. 2, p. 469.

A few specimens of this beautiful crane-fly, from the following station:—Caloundra, September 28—October 28, 1913 (H. Hacker).

GENUS LEPTOTARSUS Guérin.

1838. Voyage de la Coquille, Dipt., p. 286.
Leptotarsus (*Leptotarsus*) *macquarti* Guérin.
1838. *Leptotarsus macquarti* Guérin; Voyage de la Coquille, Dipt., p. 286, pl. 20, fig. 1.
1848. *Tipula tricincta* Walker; List Diptera Brit. Mus., vol. 1, p. 73.

One female, Brisbane, February 12, 1914 (H. Hacker).

SUBGENUS PSEUDOLEPTOTARSUS subgen. n.

Antennæ with nine segments. Terminal segment of the palpus short. Wings with cell *M1* lacking, there being but two branches of media attaining the wing-margin.

Type of the subgenus: *Leptotarsus* (*Pseudoleptotarsus*) *liponeura* sp. **n.** (Australia).

The presence of but two branches of media is almost unique in the subfamily Tipulinæ, the only other case known to the writer being the genus *Idiotipula* Alexander (Natal).

LEPTOTARSUS (PSEUDOLEPTOTARSUS) LIPONEURA sp. n.

Antennæ 9-segmented; last segment of the palpus short; general colouration yellow, the mesonotal præscutum with four brown stripes; mesepisternum and mesosternum plumbeous brown; wings pale brown, sparsely variegated with yellow; cell *M1* lacking; abdominal tergites yellow, the basal four segments ringed caudally with black.

Female.—Length, about 13-13·5 mm.; wing, 13·5-14·6 mm.

Frontal prolongation of the head yellow; nasus broad; palpi brown, the terminal segment darker, shorter than the second and third taken together. Antennæ with but nine apparent segments, the first segment yellow, the remainder of the organ brown; first scapal segment long and slender; second segment subglobular; first flagellar segment oval, the second to fourth produced into a basal pedicel, the terminal three segments nearly cylindrical; the last segment is longer than the penultimate and may be formed by the union of two small segments. Head obscure yellow, very broad behind the eyes.

Pronotum brown Mesonotal præscutum obscure yellow with four brown stripes, the intermediate pair separated only by a capillary line of the ground-colour, entirely confluent behind; a subtriangular dark-brown area at the humeral angle; remainder of the mesonotum light yellow, each scutal lobe with a conspicuous dark-brown spot at the cephalic lateral angle. Pleura obscure yellow, the mesepisternum and mesosternum plumbeous brown, the latter with a yellow spot immediately cephalo-dorsad of the mesocoxa. Halteres pale, the knobs brown. Legs with the coxæ obscure yellow, the anterior coxæ more infuscated; trochanters dull yellow; femora light brown, gradually darkening to the tips; remainder of the legs dark brown. Wings pale brown, sparsely variegated with yellowish; cells *C* and *Sc* brown; conspicuous brown seams along the cord and longitudinal veins beyond the cord; the yellow areas are restricted to the basal and anal cells, the first spot basal in position, occupying the inner end of cell *M* and near the base of *1st A* but interrupted in between; the second area lies across cells *R* and *M* immediately before the origin of *Rs*; a similar pale area across the bases of cells *R3* and *R5*; veins dark brown. Venation: Cell *M1* lacking; *m–cu* punctiform, situated at about midlength of cell *1st M2*.

Abdominal tergites yellow, the basal two segments brighter, each with a low triangular black band across the caudal margins, the apex of the triangle being directed cephalad; segments 3 and 4 are narrowly margined caudally with brownish black; remainder of the tergites yellowish; sternites yellow, segments 4 to 8 obscure brownish. Ovipositor with the valves very blunt and fleshy as in the genus.

Habitat: Queensland.
Holotype, ♀, Brisbane (H. Hacker).
Paratopotype, ♀, February 12, 1914.
Type in the collection of the Queensland Museum.

Genus HABROMASTIX Skuse.

1890. Proc. Linnean Soc. New South Wales, vol. 5 (ser. 2), pp. 93, 94.

There have been three Australian and six Ethiopian species of this genus so far made known. In the present collection, two species are included, neither of which agrees with any of the hitherto known forms.

HABROMASTIX PARALLELA sp. n.

Frontal prolongation of the head elongate, light brown; mesonotal præscutum pale brownish yellow with four darker brown stripes; mesonotal postnotum dark brown posteriorly, including a conspicuous mark in front of the halteres; halteres pale at their apices; legs yellowish, the femora and tibiæ tipped with dark brown; wings hyaline, the basal cells cross-banded with grey, in the cell behind vein *Cu* appearing as four dark-brown spots.

Female.—Length, 23 mm.; wing, 19·3 mm. Hind leg, femur, 13 mm.; tibia, 15·8 mm.; tarsus, 35 mm.

Frontal prolongation of the head very long and slender, light brown, with a narrow, slightly darker lateral line; palpi light brown. Antennæ with the basal segments light yellow, the flagellum broken beyond the basal segment, this latter elongate. Head dark brown; eyes large and protuberant, very narrowly separated beneath, more widely separated above.

Mesonotal præscutum pale brownish yellow with four darker brown stripes; remainder of the mesonotum yellow, only the posterior half of the postnotum dark brown, this including a conspicuous area on the lateral sclerites of the postnotum in front of the halteres. Pleura yellow, a conspicuous brown area on the mesosternum, ventral portions of the mesosternum, and on the outer faces of the fore coxæ. Halteres long and slender, brown, the apices of the knobs pale. Legs with the coxæ brown, the fore coxæ darker; trochanters brownish; femora pale brown, the tips broadly dark brown; tibiæ yellow, the tips narrowly dark brown; tarsi yellowish. Wings hyaline, variegated with dark brown and light grey; the costal cell is brown with three conspicuous hyaline spaces, one just beyond the *h* crossvein, the last at the end of the cell; cell *Sc* hyaline, the grey areas appear as about four bands that traverse the wings, being continuations of the brown costal areas; in the space immediately behind vein *Cu* these four bands become dark brown and very conspicuous; the hyaline bands between these grey areas are about one-half the width of the latter; indistinct whitish areas in the base of cell *R2*, bases of cells *M1*, *2nd M2*, and *M4* and in cell *1st M2*; stigma conspicuous, dark brown; a narrow brown seam along the cord; veins dark brown, paler in the hyaline areas. Venation: *Sc2* ending just before midlength of *R2+3*; *Rs* short, scarcely longer than cell *1st M2* and shorter than the basal deflection of *Cu1*; *R3* about one-half longer than *R2+3*, running parallel to *R4+5* except at the extreme tip; cell *2nd R1* narrow; inner ends of cells *R3*, *R5* and *1st M2* in alignment; petiole of cell *M1* less than one-half this cell; *m* and the deflection of *M3+4* subequal; *m–cu* obliterated by the punctiform contact of *Cu1* and *M3*.

Abdominal tergites yellow, the first brown medially; segments 2 to 5 with an oblique dark-brown dash on either side, these marks converging behind, becoming more approximated on the posterior segments, on segments 6 to 8 appearing as confluent median dashes; a triangular brown mark at the anterior lateral angle of tergites 3 to 8 and at midlength of tergite 2; sternites yellowish. Valves of the ovipositor long and straight, the tergal valves longer.

Habitat: Queensland.

Holotype, ♀, Brisbane (H. Hacker).

Type in the collection of the Queensland Museum.

Habromastix parallela is the largest species so far made known. It is most closely related to *H. remota* (Walker) *in the long petiole of cell M1 and* other characters but is readily told by the pattern of the body and wings and the venational details.

HABROMASTIX TERRÆ-REGINÆ sp. n

Antennæ of the male about one-half longer than the body; legs yellow, the tips of the femora and tibiæ dark brown, remainder of the tarsi dark brown; wings light grey, sparsely variegated with brown and subhyaline; petiole of cell *M1* very short to lacking; abdomen obscure yellow, the tergites with two brown sublateral stripes.

Male.—Length, 11·5-12·5 mm.; wing, 14-15·4 mm.; antenna, 17·5-17·8 mm.

Generally similar to *H. parallela.*

Frontal prolongation of the head yellow, with a narrow brown lateral line; palpi brown. Antennæ of the male considerably longer than the body, the basal four segments yellowish, thence gradually passing into brown. Head with a rather rather small brown area on vertex, the remainder of the vertex and occiput pale buffy.

Mesonotal præscutum brownish yellow, with four brown stripes, the intermediate pair indistinct in front and strongly narrowed behind; postnotum darkened posteriorly but with no conspicuous mark on the lateral sclerites as in *parallela*. Pleura obscure yellow, the mesepisternum and mesosternum dark coloured, with a conspicuous stripe of the ground-colour across the dorsal portions of the latter. Legs with the femora yellow, the tips broadly dark brown; tibiæ light brown, narrowly yellowish basally; tarsi dark brown. Wings light grey, sparsely variegated with brown and subhyaline; cells *C* and *Sc* brown, the former with three small yellowish areas, two being basal in position, the last apical; two small areas in the basal cells, one subbasal, the other subapical; a conspicuous whitish area beyond the cord, extending without noticeable interruption from the inner end of cell *R2* across cells *R3*, *R5*, *1st M2* into the base of *M4*; the brown area in the space behind vein *Cu* is almost continuous, but interrupted by small pale spots at midlength and near the end. Venation: *Sc* ending slightly beyond the origin of *R2+3*; *Rs* short, rather strongly arcuated at origin; *R2+3* rather short, about equal to the basal deflection of *Cu1*; inner end of cell *1st M2* slightly more proximad than cell *R3* or *R5*; petiole of cell *M1* very short to entirely lacking, shorter than *m*; cell *1st M2* comparatively large; *2nd Anal* vein comparatively short and straight.

Abdominal tergites obscure yellow with two sublateral brown stripes, the yellow dorso-median stripe thus formed being most distinct on segments 1 to 6, segments 7 to 9 being almost entirely dark brown; these brown marks on the individual segments oblique, with the posterior ends directed proximad, the posterior lateral angles of the tergites pale; basal sternites light yellow, the fifth to seventh sternites dark brown, especially across the posterior margins.

Habitat: Queensland.

Holotype, ♂, Brisbane, May 23, 1916 (H. Hacker).

Paratopotypes, 6 ♂'s.

Type in the collection of the Queensland Museum.

Habromastix terræ-reginæ belongs to the group of *H. cinerascens* Skuse and *H. ornatipes* Skuse. It is the closest to the latter but the description of the details of the wing-pattern of *ornatipes* is very different. It is readily told from *H. parallela* by the short petiole of cell *M1*, the wing-pattern, and other characters.

GENUS MACROMASTIX Osten Sacken.

1886. Berliner Ent. Zeitschr., vol. 30, pt. 2, pp. 185-187.

MACROMASTIX FLAVOPYGIALIS sp. n.

Antennæ short; frontal prolongation of the head very long and slender, dark brown; head dark, the vertical tubercle yellow; mesonotal præscutum with four dark-brown stripes; scutellum and postnotum obscure yellow; wings pale brown, the costal margin dark brown; abdomen dark brown, the base and hypopygium yellow.

Male.—Length, 12·3-13 mm.; wing, 13-15·5 mm.

Frontal prolongation of the head very long and slender, nearly twice the length of the head, brownish black; palpi dark brown. Antennæ short; scape yellow, flagellum dark brown, the base of the first segment obscure yellow; first flagellar segment not elongated; last segment shortest. Head dark-coloured, the low but conspicuous vertical tubercle yellow; front obscure yellow.

Mesonotal præscutum greyish brown with four darker brown stripes; scutum brown, the scutal lobes dark brown; scutellum and postnotum obscure yellow, the latter narrowly darkened posteriorly. Pleura obscure brownish yellow, the mesepisternum and mesosternum marked with darker. Halteres brownish yellow, the knobs darker. Legs with the fore coxæ dark brown, the remaining coxæ yellow, dark brown basally; trochanters yellow; femora yellow, the apical half passing into brown; tibiæ brownish yellow, tarsi brown. Wings pale brown, the costal and subcostal cells dark brown; stigma pale; veins brown. Venation: *Rs* longer than *R2+3*; petiole of cell *M1* shorter than *m*, sometimes only half its length; *m–cu* punctiform; cell *2nd A* rather narrow.

Abdomen dark brown, the caudal margins of the segments indistinctly paler; segment 1, the base of segment 2, and the hypopygium conspicuously light yellow. Male hypopygium with the pleurites moderately long and slender, with one complicated pleural appendage, the upper lobe of which is produced into a long, slightly curved beak, the crest with several small blackened spicules; lower lobe pale, flattened, oval, the apex rounded.

Habitat: Queensland.

Holotype, ♂, Brisbane, May 23, 1916 (H. Hacker).

Paratopotype, ♂ .

Type in the collection of the Queensland Museum.

Macromastix flavopygialis may readily be told from all the described Australian species by the very long, slender, dark-coloured frontal prolongation of the head and the conspicuous colouration of the abdomen.

MACROMASTIX TORTILIS sp n.

Antennæ short; general colouration light yellow, the præscutal stripes slightly more reddish; wings greyish yellow, the costal and subcostal cells rich brownish yellow; abdomen yellow, trilineate with brown, segments 7 and 8 chestnut brown; ninth tergite of the twisted male hypopygium large and tumid.

Male.—Length, about 10-12 mm.; wing, 12-14·7 mm.

Female.—Length, about 10-11 mm.; wing, 11·55-12·5 mm.

Frontal prolongation of head short and stout, yellowish; palpi brown, the last segment about equal to the basal three taken together. Antennæ shorter than the palpi, the scape yellow, the flagellum dark brown; flagellar segments beyond the third slender, cylindrical. Head light yellow; vertical tubercle low.

Mesonotal præscutum light yellow, with the three usual stripes more reddish yellow; remainder of the mesonotum pale yellow; an indistinct, capillary, median brown line. Pleura yellow. Halteres pale brown, the knobs darker. Legs with the coxæ and trochanters light yellow; femora yellow, the tips narrowly and indistinctly infuscated; tibiæ and tarsi brown. Wings greyish yellow, the costal and subcostal cells rich brownish yellow; stigma yellowish brown; veins brown. Venation: *Rs* scarcely longer than *R2+3*; *R3* long, parallel to *R4+5* except at the tip; petiole of cell *M1* variable in length, from as long as *m* to entirely lacking, cell *M1* being short-petiolate to sessile; *m–cu* punctiform.

Abdomen yellow, the tergites with three brown stripes, the median stripe very broad and conspicuous; segments 7 and 8 chestnut brown; hypopygium yellow, only the ninth tergite brown; sternites yellow. Male hypopygium with the ninth segment twisted around nearly one-half so that the ninth tergite occupies a ventro-lateral position; this latter is large and tumid, with a broad U-shaped median notch, the margins very thick, the conspicuous lateral lobes thus formed stout-triangular. The pleural appendages are two in number, the dorsal one (nearest the tergite though actually ventral in position) a small blackened blade with the inner edge conspicuously serrate; the ventral appendage is larger, pale, flattened, gradually dilated distally, the apical margin set with about fourteen blackened spicules of which the four inner are isolated from one another, the remaining one confluent in a slightly curved row. Ovipositor with the valves short and fleshy as in the genus.

Habitat: Queensland.

Holotype, ♂, Brisbane, July 1, 1913 (H. Hacker).

Allotopotype, ♀.

Paratopotypes, 18 ♂♀'s, July 1 (1913) and May 23 (1916)

Type in the collection of the Queensland Museum.

Macromastix tortilis is readily told from the other described species of the genus by its light-yellow colour, the trilineate abdomen, and especially the large, twisted male hypopygium.

MACROMASTIX HACKERI sp. n.

Antennæ short; general colouration yellow; wings brownish yellow, the costal margin more saturated; stigma darker brown; cell *2nd A* very narrow; male hypopygium semi-inverted, the ninth tergite pale; ninth sterno-pleurite with a pencil of about seven powerful bristles near the dorso-caudal angle.

Male.—Length, about 11 mm.; wing, 12·5 mm.

Generally similar to *M. tortilis*.

Frontal prolongation of the head short and stout, obscure yellow; palpi brown. Antennæ short, pale brownish yellow, the distal flagellar segments long-cylindrical. Head yellow.

Mesonotum and pleura dull yellowish, the præscutum without distinct stripes. Halteres pale brown. Legs with the coxæ and trochanters dull yellow, the remainder of the legs pale brown, the tips of the femora narrowly darkened. Wings with a strong brownish yellow tinge, the costal and subcostal cells more saturated; stigma conspicuous, darker brown. Venation: Basal deflection of *Cu1* at about one-third the length of cell *1st M2*; cell *2nd A* very narrow.

Abdomen obscure yellow, the lateral margins of the tergites narrowly and indistinctly dark brown; the dorso-median stripe of *tortilis* is lacking; segments 7 and 8 brown; hypopygium entirely pale yellow, including the ninth tergite. Male hypopygium of the semi-inverted type of *M. tortilis.* Ninth tergite not so tumid as in *tortilis*, with a broad and deep U-shaped notch, the dorsal surface provided with numerous stout setæ, the free ends of the tergite produced caudad and slightly inward into a subspatulate, flattened lobe. Ninth sterno-pleurite with a large, square median notch; near the dorso-caudal angle with a pencil of about seven powerful bristles that are directed dorsad and caudad.

Habitat: Queensland.

Holotype, ♂, Brisbane (H. Hacker).

Type in the collection of the Queensland Museum.

This interesting species is named in honour of the collector, Mr. Henry Hacker, Entomologist of the Queensland Museum. It is closest to *M. tortilis* but is readily separated by the diagnostic characters listed above.

LITTLE PENGUIN IN QUEENSLAND.

By Heber A. Longman, F.L.S. (Director).

Through the kindness of Mrs. Fagan, "Greenmount," Tweed Heads, a specimen of the Little Penguin, *Eudyptula minor novæ-hollandiæ* (Stephens), captured at Coolangatta beach near the southern border of this State, has been added to the Queensland Museum collections. Mrs. Fagan records that this specimen was picked up alive on the 15th May of this year; it refused to eat anything and died within about twenty-four hours after capture.

The occurrence of this specimen within the Queensland border is a matter for surprise. According to A. J. North,[1] Cabbage-tree Island, near the entrance to Port Stephens (about S. lat. 32° 40′) was the most northerly record (breeding). Coolangatta is north of Point Danger, about S. lat. 28° 7′. The Little Penguin just succeeded in crossing our boundaries.

Apparently this bird requires trinomial designation. Mathews refers to the variations shown in specimens from West Australia, Tasmania, South Australia, and New South Wales, but finds "that the white tail of the Australian form renders it separable from the New Zealand bird, which is also constantly darker."[2] He utilises Stephens's term *novæ-hollandiæ* for Australian birds as a subspecies of *E. minor,* subsequently restricting this to New South Wales forms and noting other subspecies. Alexander and Brooke Nicholls, however, after a valuable study of a large number of specimens, came to the conclusion that all the Australian birds (including *E. undina*) should be classified as *Eudyptula minor novæ-hollandiæ.*[3]

In view of the scantiness of available material for comparison no extended description is made. Our specimen has the characteristic blue-grey colouring, with a beautiful sheen, on the upper surface; the inner margins of the flippers are whitish, as is also the apical third of the tail; the fore-neck and lower surface are white. Following the body curves of the mounted specimen the bird is 460 mm. in length. The bill is 38 mm. in length; depth 15 mm.

From the excellent skin made and forwarded by Mrs. Fagan, our taxidermist (Mr. M. J. Colclough) has mounted the bird, which makes a very attractive addition to the case of penguins on exhibition.

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[1] Nests and Birds Austr. & Tas., iv, 1914, p. 392.

[2] Birds of Australia, i, pt. 5, 1911, p. 285.

[3] "The Emu," xviii, 1918, pp. 50-57.

[*MEMOIRS OF THE QUEENSLAND MUSEUM,* Vol. VII, Part I, 1920.]

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By Authority: Anthony James Cumming, Government Printer, Brisbane.

MEMOIRS OF THE QUEENSLAND MUSEUM, VOL. VII, PART II.

(ISSUED FEBRUARY 11, 1921.)

A NEW GENUS OF FOSSIL MARSUPIALS.

BY HEBER A. LONGMAN, F.L.S.,
Director of the Queensland Museum.

(Plates IV-VII.)

IN 1915, when describing a giant turtle from the Queensland Cretaceous formations, the writer ventured to forecast that, when our areas were better known, novelties rivalling the grotesque monsters of other lands would be exhumed. No new vertebrate material has yet been received from these Cretaceous sources, but remains from the Post-Tertiary deposits on the Darling Downs, which form the subject of this paper, exhibit a large marsupial with remarkable cranial contours. In life this mammal must have been bizarre as a monster in an artist's realm of phantasy. Here is a member of the Nototherium group with a skull the maximum width of which exceeds the maximum length by 46 mm.

This extreme brachycephalous condition is mainly the result of masseteric processes or large inferior lateral extensions of the anterior part of the jugal, which flare widely outwards on each side of the head, almost at right angles to the sagittal plane, at the junction of the infratemporal bar with the zygomatic processes of the maxilla. For reasons to be subsequently set out, it is suggested that this unusual development of the zygomatic arches was associated with the presence of large cheek-pouches.

DIAGNOSIS OF NEW GENUS.—The extraordinary development of the inferior lateral processes of the anterior part of the zygomata and the architecture of the very prominent suborbital platform, which acts as a buttress, demand generic recognition. These characters are also associated with a subtriangular upper premolar (dealt with in detail later).

EURYZYGOMA, genus new.

De Vis associated with the mandibles of his *Nototherium dunense* (1887, p. 1065, and 1888, pp. 111-116),* two cranial fragments (Nos. 12622 and 12618) which are obviously of the type of our new material, and which also came from the Darling Downs, being heautotypes. These specimens, however, were too incomplete to suggest to De Vis the immense accessory processes. Sufficient of the anterior zygoma root is present to show the special characters of *Euryzygoma*. It would therefore be unwise to give our material a new specific name. In the circumstances, it is necessary to use De Vis's specific name in conjunction with the new genus.

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* In this paper references are noted in the manner suggested in a circular recently issued by the Committee of the British Association on Zoological Bibliography.

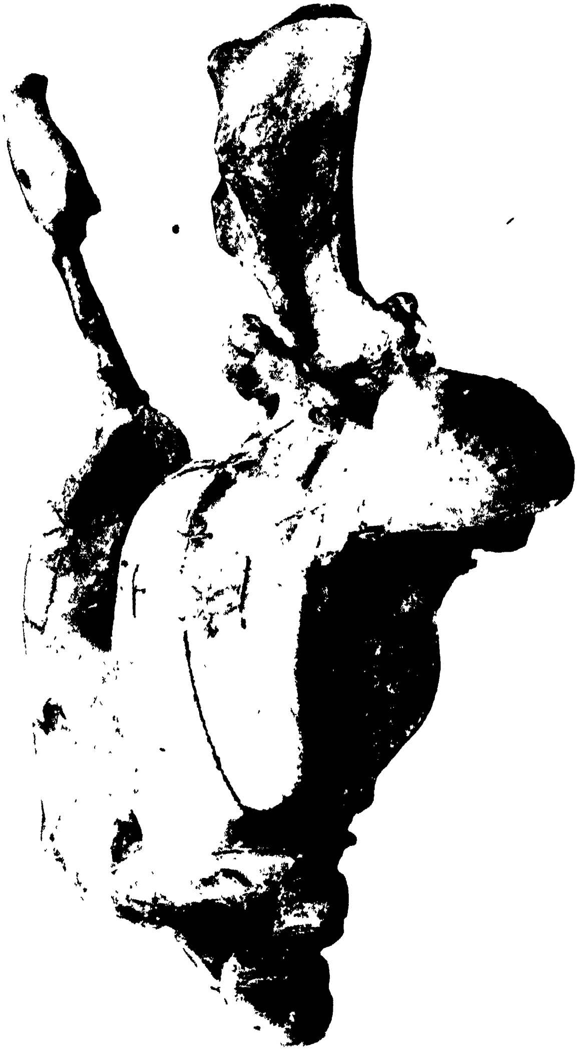
EURYZYGOMA DUNENSE.

MATERIAL.—This consists of a cranium which was received in over seventy pieces. The maxilla and premaxilla were practically the only parts which were intact. Fortunately the bones were in excellent condition, not being decomposed, and as many of the fractures were obviously made in bringing the remains to light, the zygomatic arches, with their inferior lateral processes, and the main portion of the superior cranial contours have been united without any doubt as to their real position. The fitting together of the smaller pieces, especially in the basioccipito-sphenoidal region, however, demanded infinite patience. Practically no reconstruction was necessary, the actual bones themselves supplying the natural contours, and it has been deemed inadvisable to fill in the comparatively unimportant missing parts. The full molar series is present on each side, but the incisors have been lost *post mortem*.

The specimen was probably a fully mature male. Many of the cranial sutures are ankylosed to extinction. Reg. No. F 1327.

LOCALITY.—The cranium was discovered in sandy soil at a depth of about 70 feet at Brigalow, Darling Downs, Queensland, when a well was being sunk on the property of Mr. G. A. F. Kleidon, who subsequently donated the fragments to the Queensland Museum. On behalf of this institution it is my pleasant duty heartily to thank Mr. Kleidon, and also Mr. Wilson who forwarded the pieces. It is to be hoped that this handsome donation will be supplemented later by remains from this district demonstrating an association of bones.

DESCRIPTION.—The maximum length of the cranium "between uprights" (condyles to gnathion) is 634 mm.; the maximum breadth across the zygomatic processes is 680 mm.; the maximum height (between parallels from the bregma and the inferior border of the zygomatic processes) is 343. The calvarium is dwarfed by the extraordinary development of the zygomatic arches and processes. The breadth of the occiput (calculated from the fairly complete left moiety) is approximately 290 mm. The occipital region, which is somewhat concave, with a median vertical ridge, slopes forward at an angle of 45° to the plane of the bony palate. Posteriorly the lambdoid crest is broadly convex. From the lambdoid crest, the superior contour of the calvarium along the



EURYZYGOMA DUNENSE; lateral view.
Approximately one-fifth natural size.

Photo.—H. W. Mobsby.

sagittal suture to the fronto-nasal depression is practically a straight line, which is parallel with the plane of the bony palate. There is no parietal platform, and the cranial walls, when losing their curves of contact with the occiput, slope in straight lines to their fractures. In the mid-parietal region these walls form an angle of 50°. The lower moieties of the lateral walls are missing.

On the dorsal surface the sutures between the parietals and frontals are obscured. In this area the sagittal crest bifurcates, as in *Phascolarctus*; the frontals rapidly widen and when in line with the inferior zygomatic processes they attain a breadth of 148 mm. This breadth is apparently continued (contours incomplete) through the course of the fronto-nasal depression. The concavity of this depression is wide, the sides and posterior wall sloping sharply to the main frontal platform. The course of the fronto-nasal sutures cannot be traced with accuracy. The terminal areas of the frontal bones are slightly rugose on the slope of the depression, and there are a few very small nutrient foramina. A small horn or frontal boss may have been attached here (*cf.* Scott & Lord, 1920).

Nasals.—From the frontal depression the nasals reach almost to a point above the gnathion. Except for a slight convexity, which is double in the anterior region where the median suture is open, they are surprisingly flat on their upper surface, which projects forward at an angle of about 18° to the plane of the bony palate. Their course does not appear to be curved, or to terminate in a deflected obtuse apex. The left-hand moiety is perfect anteriorly, and is 88 mm. in width. A right-hand fragment is sufficient to give fair evidence of symmetry, and the approximate width would thus be 176 mm. There is no evidence whatever of the presence of bony studs, of which Scott and Lord have made interesting studies in Tasmanian material (*N. mitchelli*), or of attachments for a horn, as first suggested by Macleay in his original description of "Zygomaturus trilobus" in 1857 (quoted by Owen, 1859, p. 169).

The lateral portions of the naso-maxillo-premaxillary region are, unfortunately, too incomplete to be correctly allocated, and it has been thought inadvisable to restore the missing parts. It is evident that the anterior portions of the nasals projected clear of lateral supports for a distance of at least 75 mm. Fragments of the sides, and especially one piece exhibiting the maxillary-nasal suture, show the great strength of the bones supporting the main nasal arch. On the inner median surface of the nasals, near the suture with the frontals, may be seen two large sub-contiguous channels, 11 mm. wide and 5 mm. deep, and these extend towards the anterior extremity where they are merged in the general concavity of the inner tables.

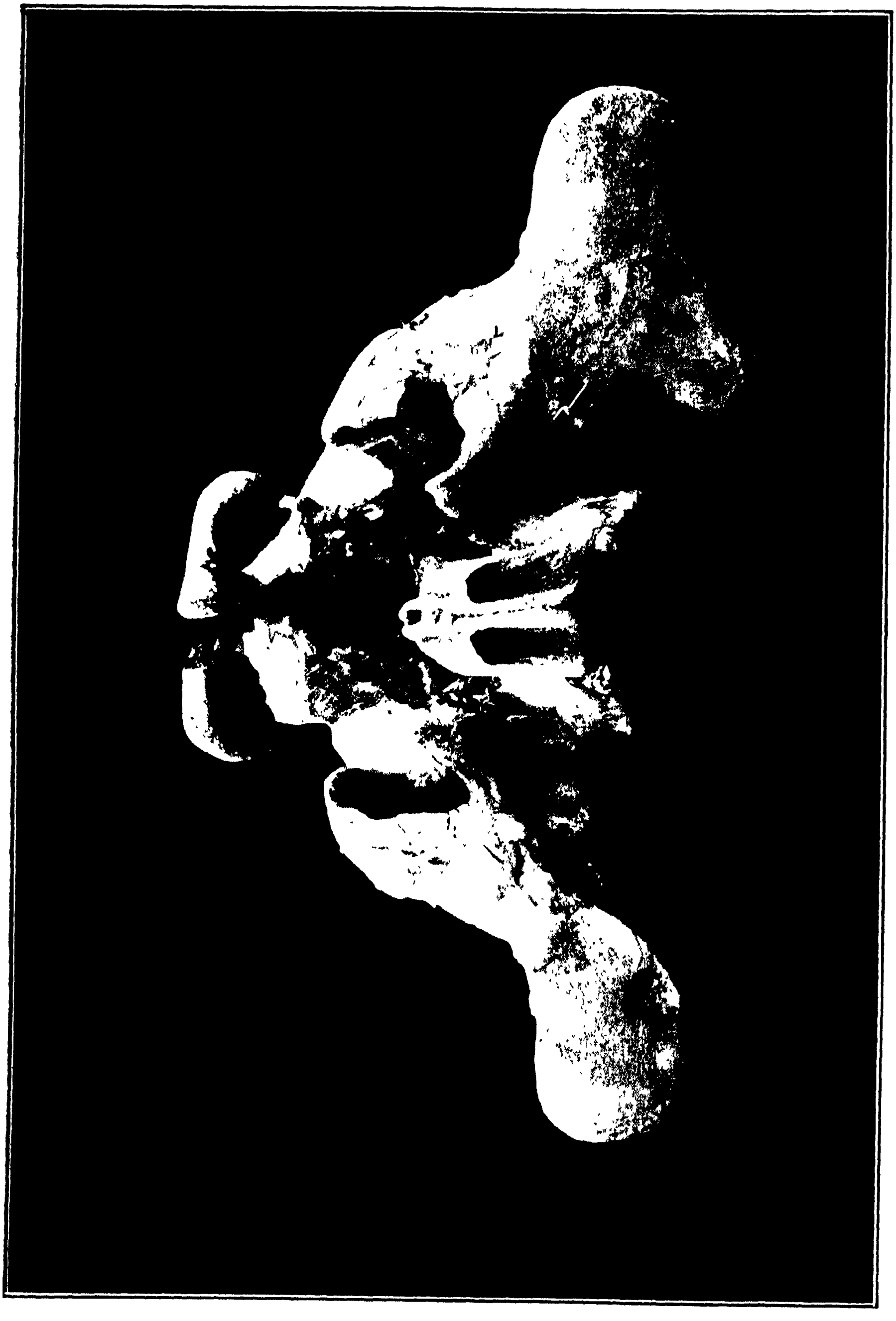
Zygomatic Arches.—These are fairly symmetrical. Part of the ventral border of the left arch is missing, and the right inferior lateral process is incomplete in its inner contours, but fortunately the opposite bones are in excellent condition. The dorsal or superior border of the squamosal element of the arch is at first shortly concave when leaving the occipital region, being then slightly and evenly convex until the downward sweep of the orbit is reached. The inferior or jugal border is much more robust, attaining a thickness of 56 mm. where the jugal approaches the glenoid cavity. In this respect the cranium resembles the relationship of these parts in *Phascolarctus*, the posterior extension of the jugal being a primitive condition.

The squamosal element appears to be produced anteriorly to a greater extent than is to be found in either *Phascolarctus, Phascolomys*, or *Macropus*, and sends a V-shaped strip of bone as far down as the mid-region of the orbit. The line of demarcation between the squamosal and jugal bones can be readily traced throughout the arch. The height of the arch opposite from the fronto-parietal suture is 130 mm., the squamosal element here having the greater share. The walls are not vertical, but sweep outward as they gain depth; in fact, a section taken through the arches in the mid-parietal region would show, with the contours of the occiput behind, a slightly flattened semicircle, the radius of which would be about 8 inches. The maximum width of the zygomata, apart from the outstanding processes, is 415 mm.

W. K. Parker (1886) pointed out that an inordinately large squamosal is characteristic of the Marsupialia. In the arch of *Euryzygoma* this bone reaches its maximum development. It is to be regretted that the squamous plate is missing and that its extent on the walls of the cerebral chamber cannot be traced. In the Marsupialia this plate reaches its maximum in *Wynyardia bassiana* (Baldwin Spencer, 1900, p. 779).

Owing to the incompleteness of the cranial walls the width of the temporal fossa cannot be accurately estimated, but in the mid-parietal region it was evidently about 65 mm., widening somewhat anteriorly. The facial portion is elongated, as may be seen from Plate V, and the width averages 77 mm. The orbits are low, but not to the same extent as in *N. mitchelli*, being 90 mm. above the alveolar margins of the molars. Although the outer margins of the orbits are more posteriorly placed than is the case in *N. mitchelli*, there would have been little scope for lateral vision, and *Euryzygoma* evidently went through its world viewing only the region immediately in front.

A slight prominence on each side of the orbit, situated at the origin of the suture between the jugal and the squamosal, indicates rudimentary postorbital processes. Part of the inner margin of the orbits and the lachrymals are missing.



EURYZYGOMA DUNENSE : frontal view.

Photo.—H. W. Mobsby.

[Face Page 69.]

INFERIOR LATERAL PROCESSES.—Across the processes the extreme breadth is 680 mm. On the left-hand side the maximum transverse diameter of the inferior lateral process is 231 mm. The vertical height of the process in its lateral extension beyond the arch is 121 mm. The maximum thickness is 47 mm. The extreme height of the combined elements, from the superior border of the squamosal to the inferior border of the vast processes (taken from parallels) is no less than 285 mm. When the cranium is resting on the inferior borders of the processes the molar series are 64 mm. above the surface. This downward development is surpassed by the inferior processes of *Mylodon,* but in that mammal there are no lateral extensions.

The processes flare outward almost at right angles to the sagittal plane, as may be seen from Plate V. They are not, however, straight, but slightly curved, the lateral margins being in advance. There are prominent rugose areas on the superior border of these processes, just at the origin of their lateral extensions, these being doubtless for the attachment of parts of the masseteric muscles.

The origin of the zygomatic process of the maxilla is primarily a vertical plate which abuts on practically the whole of the vertical face of the maxilla, commencing parallel with the anterior lobe of the third molar, and being about 30 mm. in thickness; this is supported above by the horizontal orbital plate 14 mm. thick, *which is produced anteriorly at right angles to the vertical constituent,* forming a triangular platform which is continuous behind with the superior border of the maxilla: this horizontal orbital platform unites the vertical plate with the strong convex bar which forms the lower border of the orbit, and through the inner root of which the large infra-orbital foramen passes. The lateral extension of this bar forms a strong supporting buttress for the accessory processes. With the exception of the suborbital bar, the whole pier is composed of maxillary elements, but the sutures at the orbit cannot positively be traced, owing to fractures. The whole architecture of this part of the skull is quite unlike the piers of the zygomata in Macleay's cast, and is also absolutely distinct from other cranial fragments in the Queensland Museum attributed to *N. victoriæ.* The deep rectangular suborbital recess is a marked feature.

Of the extreme width of the accessory process, the maxilla forms less than one third. The zygomatico-maxillary sutures on the anterior surface are produced laterally to a far greater extent than are those on the posterior surface, giving the maxillary element, as illustrated in Plate V, a greater proportion than really exists. It may here be noted, as W. K. Gregory (1910, p. 221) has pointed out, that many of the cranial bones of marsupials are very oblique in their areas of contact.

Maxilla and Molars.—The bony palate is well preserved and there are no signs of fenestrations. The floor is slightly concave transversely, with a median ridge. At the border of the mesopterygoid fossa there is a prominent transverse ridge, through which a foramen runs on each external corner. The average depth of the palate below the alveolar margins is 7 mm.

The molar series are in symmetrical arcs, the lobes of the teeth being obliquely set. Fortunately all the teeth are *in situ*.

Premolar: The premolar is subtriangular: length 20 mm., breadth 18 mm. There is a single oblique transverse lobe, on which a wide tract of dentine with a posterior loop is exposed. This has evidently been worn from a single central cusp with a median posterior depression. There is a narrow posterior talon, the lingual border of which is continuous on the inner side with an anterior talon on the contracted front angle of the tooth. This premolar agrees well with that described by De Vis (1888, p. 115) as typical of his *N. dunense* and also illustrated in his accompanying Plate. Both teeth are well preserved in our specimen, and no special differences are to be noted between them. The relations of the premolar with those of other Nototheres are commented on elsewhere.

Molars: The bilophodont molar series is well worn, a tract of dentine 8 mm. wide being exposed on the hind lobe of m^1. From m^1 to the front lobe of m^3 the series gradually increases in size. The posterior lobe of m^3 is less wide than the anterior. M^4 is anteriorly slightly less wide than the corresponding lobe of m^3, and the hind lobe is markedly narrowed. Anterior and posterior talons are well developed throughout, except in the first true molar, where demarcations are lost in the surfaces of wear. The anterior talons on the second, third, and fourth molars are more developed on the lingual surface, whereas the posterior talons are more prominent labially, this being in consonance with the oblique setting of the lobes. On the lingual side the valleys between the lobes are bounded and partly closed by a tubercle arising from cingular processes, but these are not so marked on the outer side.

Dimensions.	mm.
Antero-posterior diameter of molar series with pm^4, right	172
Antero-posterior diameter of molar series with pm^4, left	169
Width of m^1, anterior lobe	28
Width of m^2, anterior lobe	35
Width of m^3, anterior lobe	36.5
Width of m^4, anterior lobe	35
Palate breadth between outer corners of pm^4	102
Palate breadth between outer corners of m^1, front lobe	158
Palate breadth between outer corners of m^4, hind lobe	152
Palate breadth between inner corners of pm^4, front lobe	64
Palate breadth between inner corners of m^3, front lobe	85
Palate breadth between inner corners of m^4, front lobe	90
Diastema	112
Palatal length,[*] palation to gnathion	390

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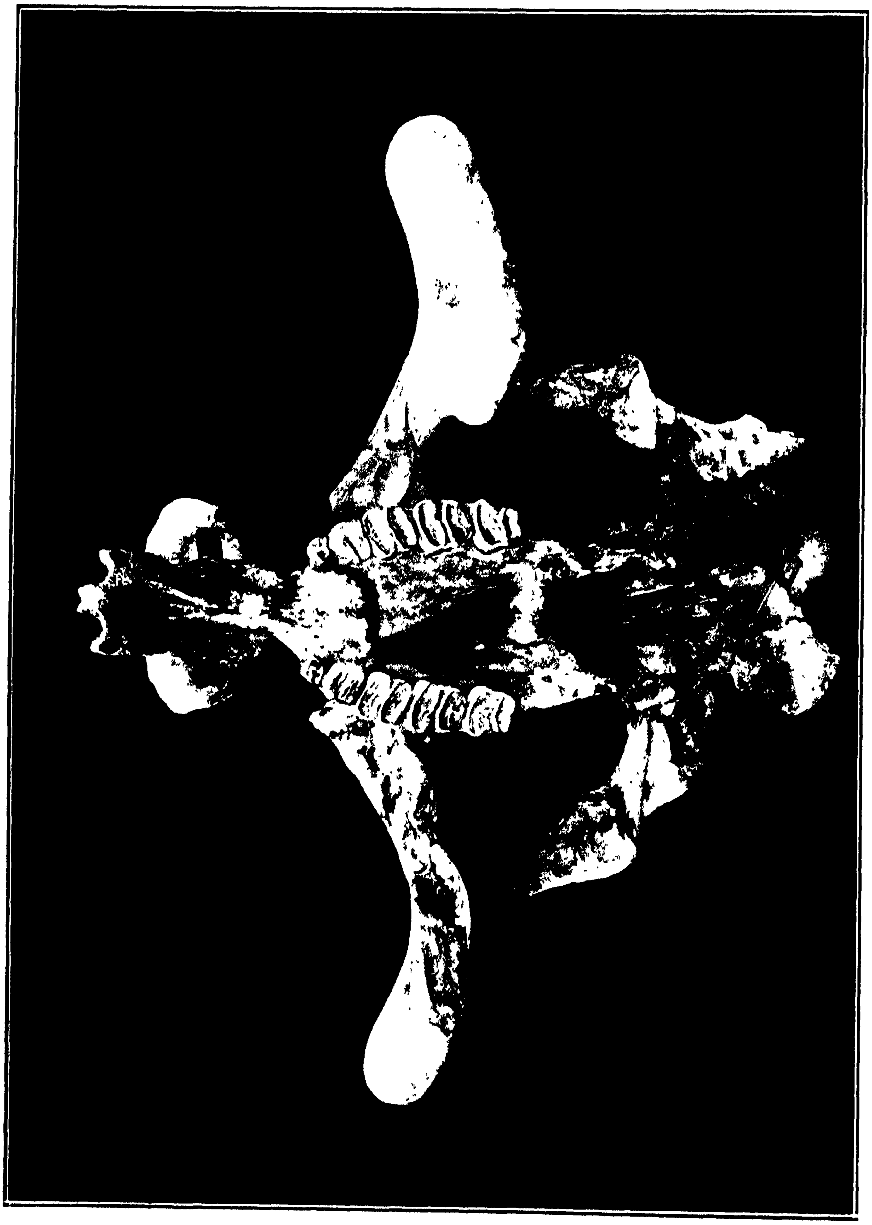
[*] Oldfield Thomas, Nomenclature of Measurements, Proc. Biol. Soc. Wash., xviii, p. 192, 1905.

MEMOIRS OF THE QUEENSLAND MUSEUM

VOL. VII, PLATE VI.



EURYZYGOMA DUNENSE: ventral view.

Photo.—H. W. Mobsby.

[Face Page 71.]

The maxilla extends anteriorly on the floor of the palate for a distance of 110 mm. beyond the premolars. The palate is here convex with a median groove. The lateral sutures between the maxilla and the premaxilla cannot be satisfactorily traced.

Premaxilla.—Euryzygoma dunense is relatively longer in the facial region than is the cast of the cranium described by Macleay. The gnathion is 187 mm. from the anterior borders of the premolars. The diastema is 112 mm. In section the premaxilla is subquadrate. Owing to fractures its union with the nasals is missing on both sides. On its palatal surface it is concave in the region between the two posterior incisors, where there are three small foramina. The premaxilla is thickened anteriorly and its superior margin terminates in a raised oval boss, which suggests an attachment for cartilage. At the alveoli of the large first incisors the width is 74 mm., and the height is 101 mm. The incisors have been lost, *post mortem*, but the dimensions and disposition of their cavities give valuable evidence of their nature. The large anterior pair were evidently strongly curved in their downward course, and were subcylindrical and only slightly diverging. At the antero-inferior border the alveoli are separated by a distance of 19 mm. A loose incisor, 23 × 29 in diameters, from another specimen, fits fairly well into either cavity. On the anterior surface of the premaxilla there are extensive exposed alveolar surfaces. The alveolus of the second incisor, which is contiguous with that of the first on the labial border, is approximately 13 × 11. The third incisor alveolus is placed on the labial border about 15 mm. behind that of the second, to which it is subequal. It is evident from its contours that the third incisors were obliquely set and procumbent in position.

For purposes of description the premaxilla has been treated as a single and not as a paired bone.

Glenoid Fossa.—Although the postglenoid process is very incomplete, the actual fossa is well preserved on the right-hand side. This is 102 mm. in length, whilst the actual concavity, apart from its shelving anterior border, is 15 mm. Some idea of the articular surface of the mandibular condyle may be gauged from these dimensions. The plane of the fossa is set at an angle of 85° to the median line of the cranium, the condyle thus being scarcely oblique in its setting. Laterally the posterior extension of the jugal forms part of the shelving anterior border of the fossa.

Basal Bones.—The basioccipital and basisphenoid have been greatly fractured, about fifteen segments forming the contours which have been put together. The combined bones slope upwards at an angle of 18° from the plane of the bony palate, being 12° less than the angle noted by Owen for the cast of

Nototherium. From the palation to the basion the distance is 220 mm. The aperture of the posterior nares at the palation is 53 mm. deep and about the same in width. The posterior borders of the mesopterygoid fossa are incomplete, but there was a depth of at least 65 mm. The walls of the fossa expand somewhat in their course from the maxillary region. In section the fossa is U-shaped. The external walls are marked with very prominent tubercules for muscle attachments. On each side a large entocarotid foramen is to be seen, which perforates the floor of the basisphenoid and enters the inner tables between the Gasserian grooves, its course having been cleared on the left-hand side.

The sutures between the basioccipital and basisphenoid on the inferior surface can be traced at a distance of 83 mm. from the basion. The inferior surface of the former bone is deeply concave, with a strong longitudinal ridge. In its advance from the foramen magnum the bone somewhat narrows in breadth.

The contours of the foramen magnum are not quite complete. The transverse section is oval, with diameters (approximately) of 65 × 35. Both condyles are present, but only the right can be conjoined with its natural surface. Its diameters are: Maximum length 78 mm.; extreme breadth 42 mm. Unfortunately the lateral elements of the occiput are largely missing.

The prominent condylar foramina are paired, being subequal, and externally the openings are separated by a distance of 7 mm. It has been suggested that the accessory foramen is homologous with those of the *Creodonta.*

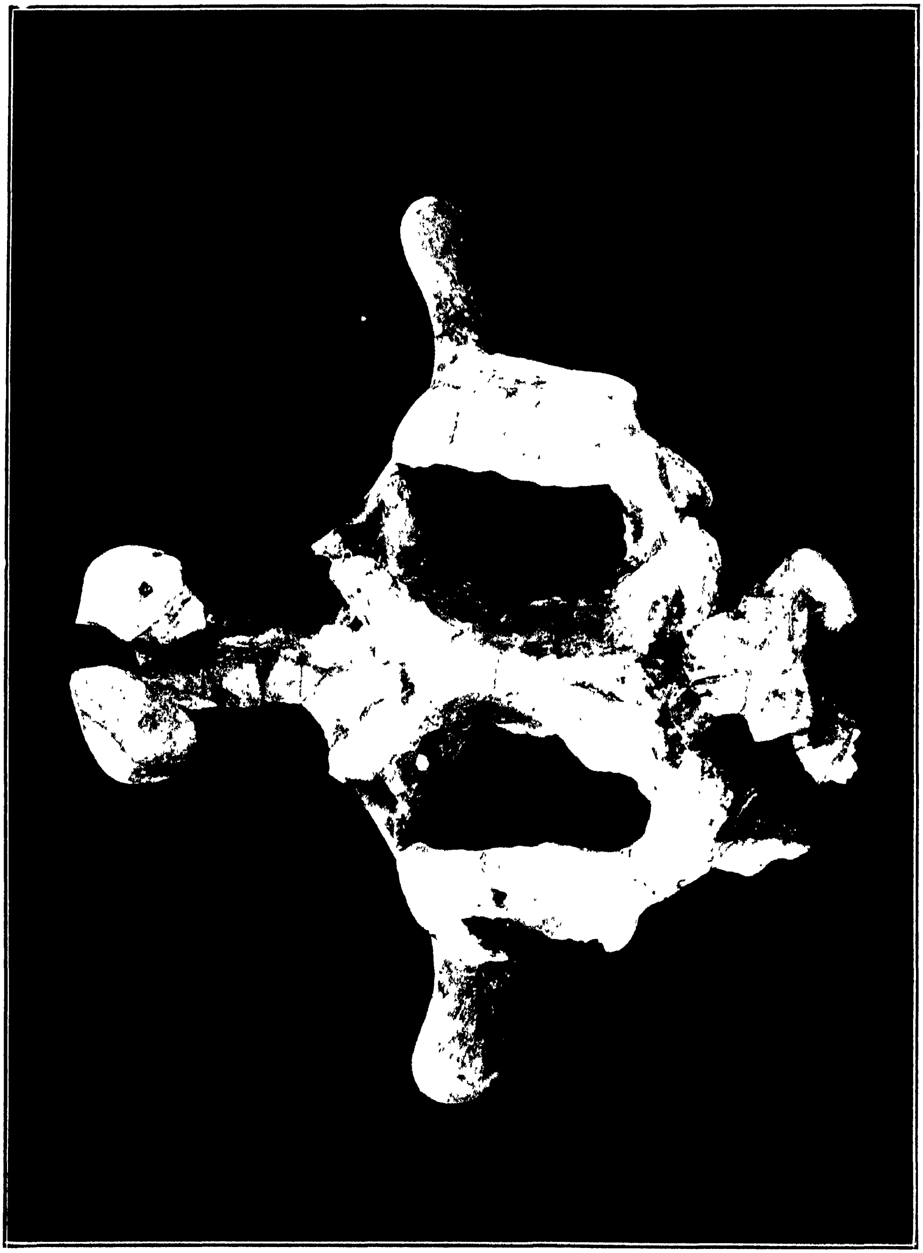
Interiorly the basioccipital and basisphenoid form a level platform about 65 mm. in width, but the supero-lateral elements are missing. On the external border of the former may be seen, at the fractures, part of a large groove which probably corresponds with the inner border of the jugular foramen.

There are prominent grooves, slightly diverging anteriorly, for the accommodation of the Gasserian ganglion; from the grooves posteriorly the position of the foramen rotundum is barely indicated on each side. Anteriorly the basal bones are incomplete, and the whole ethmoid region is missing.

In the mature cranium of *Phascolomys* the cranial walls are greatly thickened in the supra-occipital region, and large sinuses are present which are not to be found or are but slightly developed in *Macropus* and *Phascolarctus.* Our fossil resembles the wombats (*Phascolomys*) in this respect. The walls of the cranium are surprisingly thick in this area and large sinuses are present.

The internal tables of the cranium, in so far as they are available for description, exhibit irregularities in the region of the sagittal suture. There is an irregular median ridge, which is much distorted in the mid-parietal region, probably associated with a sinus. The crania of many marsupials are much thickened in the sagittal region. Anteriorly there is evidence of large frontal sinuses.

VOL. VII, PLATE VII.



EURYZYGOMA DUNENSE: dorsal view

Photo.—H. W. Mobsby.

[Face Page 73.]

The cerebral chamber was evidently small and elongated. The brain was of the elongated type, having such reptilian affinities as may be assumed from a comparison of the cranium of the marsupial *Thylacinus* with that of the dingo. Judging from such measurements as can be taken, the brain of *Euryzygoma* appears to have been relatively smaller than those of the native bear, kangaroos, and wombats. The parietal walls meet in transverse section at an angle of 50°, and the superior areas of the brain were thus much constricted laterally.

Cheek-Pouches.—Owen (1877, p. 259) refers to the maximum development of the zygomatic arches in the Nototheres, and records the necessity for increased attachment areas for the premasseter muscles. In *Euryzygoma* the masticatory muscles were doubtless strongly developed, but it seems to the writer that the bony architecture of the inferior lateral processes is too massive to be entirely accounted for in this way. Much of the area is also so smooth that the extensive origin of masticatory muscles is not suggested. The development of large cheek-pouches may therefore be assumed in association with these huge processes. There can be no direct evidence bearing on this point, but it is interesting to note that the Pocket Gophers, or Geomyidæ, of North America as illustrated by C. H. Merriam (1895) show a great development of the zygomata, although there are no inferior lateral processes. The cheek-pouches of these rodents are characteristic.

It would undoubtedly have been of advantage for this gigantic herbivorous marsupial to be able to obtain large masses of food, probably from swamp vegetation, some of which could be temporarily stored in cheek-pouches, and digested at leisure. It may even be suggested that the presence of the large crocodile, *Pallimnarchus pollens* De Vis (whose remains are found in the same deposits) made a hurried meal sometimes a necessity for *Euryzygoma*.

In his study of the Geomyidæ, C. H. Merriam (1895) has pointed out that with advancing age there is a lateral development of the zygomatic arches. Probably the inferior lateral processes of *Euryzygoma* are relatively more prominent in adult than in juvenile forms. A study of present-day marsupial crania, however, shows that no great change takes place with age.

It is of great interest to note that in the Native Bear (*Phascolarctus*) and the Wombats (*Phascolomys*) small cheek-pouches have been recorded (Forbes, 1881, p. 182).

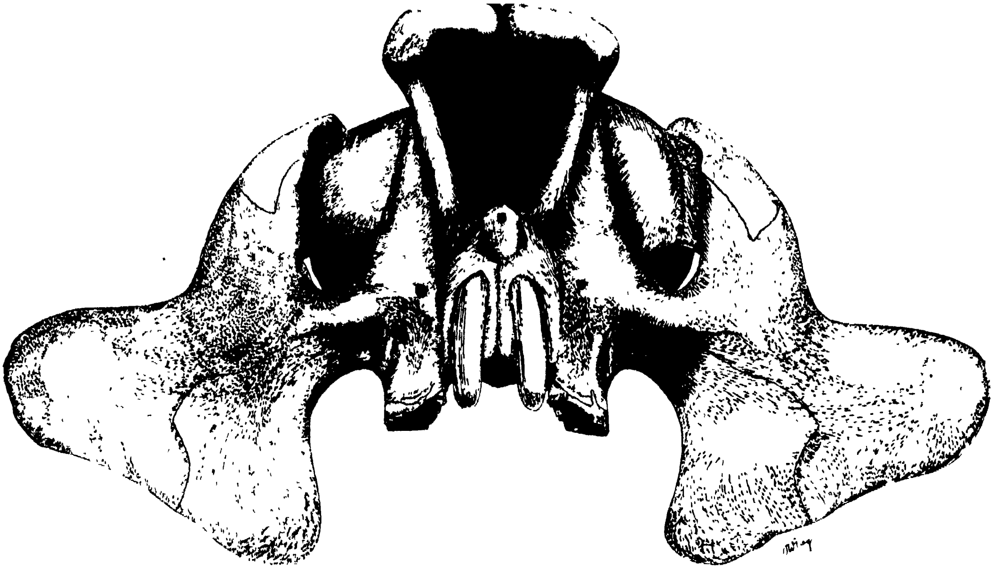
Had the cranium of *Nototherium mitchelli* not been already known, the special processes of *Euryzygoma* would have appeared to be still more remarkable. The evolution of the latter from true *Nototheriums* can be realised, however, and another instance is afforded of the astounding variety to be found amongst the Marsupialia.

Euryzygoma may be defined as a specialised member of the Nototherian group, and, to use Gregory's terms, its large processes were a cænotelic character related to special food-habits.

Mandibles.—Unfortunately there is no mandible directly associated with the cranium under review. De Vis (1887, p. 1065) described three examples, one (No. 5489) being illustrated as the type. His diagnostic characters are here reproduced:—

"Tusk-like incisors well developed; premolar small, sub-triangular, unilobate; inlet of dental canal much behind postmolar angle and much above alveolar level; exterobasal ridges of molars interrupted: talons anterior and posterior well developed: molars gradually enlarged: inner symphysial curve opposite hinder lob of m^1."

A full description of the three examples follows in the original paper. In the following year, De Vis (1888) illustrated the upper subtriangular premolar of "*Nototherium dunense*," previously referred to in this paper as a heautotype.



Text-fig. 1.—EURYZYGOMA DUNENSE. Reconstruction of cranium; one-fifth natural size. *Drawn by O. W. Tiegs*

TAXONOMIC.—In classifying the Marsupialia of to-day the premolar is recognised as the most important tooth, and that tooth alone is sufficient to establish the identity of many species. The evidence of divergent premolars is thus not to be lightly put on one side. Lydekker (1889) thought that the large complex premolar on the right side of Macleay's "Zygomaturus trilobus" was an abnormality or was incorrectly associated with the cranium. Scott (1915, p. 10) also quotes a remark from him which shows that Lydekker did not consider this oval tooth as characteristic of *Nototherium*. But Scott's illustrations and descriptions show that this large tooth is associated with the specimen described by him as *Nototherium tasmanicum* and with *N. mitchelli*. Glauert (1912) also figured (Plate VI, fig. 10) a West Australian tooth of a somewhat similar character. Amongst our specimens are three loose teeth of this type and an additional one is *in situ* in a maxilla with the rest of the molar series. It should also be noted that one of the teeth figured as the type of *Prochærus celer* by De Vis is of interest here, as pointed out by the writer when dealing with this material (Longman, 1916, p. 86).

In response to my request, Mr. Charles Hedley, Australian Museum, has kindly forwarded a note on the premolars of Macleay's "Zygomaturus trilobus," as observed by Messrs. Thorpe & Troughton, of the Museum staff. This states that both teeth are firmly *in situ*, the right one being nearly complete, but that "on the left side is badly fractured."

This clearly shows that the large oval premolar is not an abnormality, but a definite characteristic of Macleay's "Zygomaturus trilobus." It certainly follows that *all crania with triangular premolars are generically distinct.*

Although *Nototherium inerme*, first described by Owen (1845, p. 231) as indicating a distinct genus "by a total absence of incisors," has page precedence (a single page!) over *N. mitchelli*, the rules of international zoological nomenclature give latitude for the selection of the second species as the type. *Nototherium mitchelli* is certainly the "best described, or best figured, or best known" of the three species recorded by Owen from mandibular types. Notwithstanding the discrepancies between the views of Owen, Lydekker, and De Vis as to the premolars of *Nototherium*, Lydekker's action in taking *N. mitchelli* as the typical species should be confirmed, and that species is hereby selected as the type of *Nototherium, sensu stricto.* The cranium described by Macleay thus becomes a heautotype, and *Simoprosobus* De Vis (1907) is a synonym. A second species is *N. tasmanicum*, the subject of Scott's excellent monograph (1915).

Apart from *Euowenia*, there are two other kinds of Nototherian crania with subtriangular premolars. In one, typified by *N. victoriæ*, the zygomatic arches are relatively normal, and judging from fragments in the Queensland Museum these crania may require a distinct generic name when better known.

Euryzygoma represents the third section. In this genus the zygomatic arches reach anteriorly the remarkable development recorded in this paper, and the anterior zygoma root is deeply recessed under a horizontal infraorbital platform.

Taking only dental characters into consideration, these results can be tabulated thus:—

Incisors $\frac{3}{1}$—
  Upper premolars oval, tuberculated .. .. .. *Nototherium, sensu stricto.*
  Upper premolars subtriangular.
    Cusp, single, transverse, with a shallow posterior cleft .. .. *Euryzygoma.*
    Labial cusp extended antero-posteriorly .. .. "*Nototherium victoriæ and inerme.*"
Incisors $\frac{2}{1}$—
  Upper premolar subtriangular .. .. *Euowenia.*

These dental characters are, of course, supplemented by other important features, as detailed elsewhere.

Nototherium inerme and *victoriæ* were included by Lydekker (1887, p. 162) as synonyms of *N. mitchelli*, but the same author later (1889, p. 152) suggested that "*Nototherium dunense*" of De Vis was to be associated with *N. inerme*, and probably a distinct species. But *N. inerme* with its inconspicuous lower incisors cannot be associated with *N. dunense*, for the type mandible of the later species, although scarcely mature, is well armed with a large incisor. To resolve one as a sex variation of the other does not seem justifiable. Owen's maxillary heautotype of *N. inerme* as illustrated in Plate XLIII, and as described on p. 277 of the "Extinct Mammals of Australia," has a "triangular tract of dentine exposed extended antero-posteriorly," and is certainly not conspecific with the premolars in our cranium.

It may here be mentioned that G. Krefft used, in manuscript only, the name "Zygomaturus macleayi" for a perfect palate figured in Plate VII of his "Australian Fossil Remains," published in 1882 as a Parliamentary paper. We are indebted to Mr. C. Hedley for a copy of the unpublished explanation of the plates. The structure of the premolars cannot be satisfactorily defined from the illustration, but these teeth were evidently of the subtriangular type.

Scott and Lord (1920) have divided Nototherian crania into megacerathine and leptocerathine groups, but our specimens cannot be placed in their diagnostic tables. The wide nasals of *Euryzygoma* are associated with a parietal crest, with, of course, other discrepancies. The useful work done by the Tasmanian authors only applies to the material under their review.

Euowenia grata and *robusta* De Vis (1887 and 1891) are placed by Scott and Lord with *Nototherium tasmanicum.* They do not, however, give sufficient evidence for the association of the cranium and mandibles described by De Vis, with two upper incisors only on each side and a small subtriangular premolar, with *N. tasmanicum* with three pairs of incisors and a large oval premolar.

Scott and Lord (1920, p. 87) make the remarkable statement that *N. dunense* "really relates to *Phascolonus*." On the strength of the confusion between the genera *Sceparnodon* and *Phascolonus*, elucidated by Sterling (1913), they assume that "the claims of the type jaws of *dunense* to any genus other than that of *Phascolonus*, became remote." But the molars of *Phascolonus* are of the curved, rootless type of the Phascolomyidæ, and the generic association with them of *N. dunense* with its bilophodont molars, talons, and separated fangs is unthinkable. Such unwarranted attempts to dispose of the species of previous authors are not in keeping with the value of the excellent work done by the Tasmanian authors on their own fine material.

Most of the difficulties which have arisen over the classification of Nototherian remains are due to the fact that the first four species were primarily described from incomplete mandibular elements. This is most unfortunate, for it is evident that the mandible does not carry specific characters in so marked a degree as does the cranium. As the years go by it is to be hoped that definitely associated bones will shed still further light on the several species of these quaint animals. Such an association might give us information as to the large and very wide humerus, incorrectly linked by Owen with his *Nototherium mitchelli*. It would not be altogether surprising if the wide-faced *Euryzygoma* were found to be equipped with such widened humeri.

In 1915, Scott (p. 45) suggested that the future might demonstrate two races of Nototheres, "one with humeri approaching the *Diprotodon* type, and the other approximating to the wombat type."

In its complex of characters *Euryzygoma* shows affinities with *Phascolarctus* (Native Bear), *Phascolomys* (Wombats), and *Macropus* (Kangaroos). The Nototherian group apparently arose from a common ancestry before the families represented by these three genera were differentiated. In his study of the evolution of the Australian Marsupialia, B. A. Bensley (1903, p. 159) notes *Nototherium* as representing one of the ancestral types leading towards *Diprotodon*. *Euryzygoma*, however, represents a specialised lateral offshoot which became extinct, and is another interesting instance of radial evolution.

FAMILY.—The genus *Diprotodon* was established by Owen in 1838, but the great palæontologist did not define *Nototherium* until 1845. Most of the later writers have included both genera in one family. Should this be done, the term *Diprotodontidæ* (Gill, 1872), as used by Bensley (1903) and W. K. Gregory (1910), has precedence over *Nototheriidæ* (Lydekker, 1887), following the custom of using priority as a basis for family names. Lydekker (1887), however, recognised both families. When the skull of *Diprotodon* is more fully known, adequate evidence for this distinction may be forthcoming. As the crania of *Diprotodon* in the Queensland Museum are by no means complete, the question cannot be dealt with in detail here. It may be pointed out that there are divergencies between the zygomata of *Diprotodon* (as illustrated by Owen) and those of *Nototherium* (as figured by Scott). But the relatively short squamosal and the oblique suture between it and the jugal in *Diprotodon*, as shown by Owen, are not present in our specimens. The relations of the jugal and squamosal in *Diprotodon* are evidently not very dissimilar from those in *Nototherium*, although the bones are relatively much more slender.

The scalpriform upper incisors of *Diprotodon* are very distinctive, and the whole cranium is, of course, much more elongated. These cranial distinctions may be supported by other evidence, and a full comparison of the two groups would be of great interest. At present, therefore, it seems best to retain the Family *Nototheriidæ* for *Euryzygoma* with its closer allies, but Lydekker's definition of the premolar as "triangular, small" obviously must be extended to include the oval type present in *N. mitchelli* and *tasmanicum*.

Gill's work on the arrangement of Mammalian Families (1872) is not available to the writer, and the reference to *Diprotodontidæ* has been taken from T. S. Palmer's useful Index Generum Mammalium, 1904.

HORIZON.—Comment on the stratigraphical relations of the locality of *Euryzygoma* is outside the scope of this paper, but reference may be made to authorities. The Geology and Palæontology of Queensland (Jack and Etheridge, 1892) contains notes made by pioneer workers, and it will be seen that Brigalow, which is 190 miles from Brisbane on the Western Railway line, is within the "happy hunting grounds" noted (p. 605) by the late G. F. Bennett, the discoverer of *Meiolania*. Although the deposits have been referred to in this paper as Post-Tertiary, following these authorities, it has been pointed out by Professor Sir Edgeworth David that it is harder in Australia than in Northern Europe to separate Post-Tertiary from Tertiary rocks (1914, p. 285). Possibly the work being done in elucidating the nature of petrified wood, at the instigation of Mr. B. Dunstan, Chief Government Geologist, Queensland (1920), will ultimately afford more definite evidence as to the age of these Darling Downs remains.

CONCLUSION.—We are probably dealing with a group of large marsupials whose remains were deposited during a period of rapid evolution. A gradual alteration of climate from luxurious to more arid conditions, enforcing dietary changes, would afford stimuli resulting in marked variation. It seems to be a demonstrated fact that, when groups are approaching extinction, some of the members tend to assume bizarre characters. Many of the smaller marsupials evidently survived the climatic changes since early Pleistocene times because of their adaptability to a less luxurious diet and their mobility. When one realises the heavy toll taken from our herds to-day by a period of prolonged drought, it is easy to imagine a similar catastrophe bringing about the extermination of such bulky and cumbrous animals as the *Diprotodon*, *Nototheriums*, and *Euryzygoma*. Be this as it may, it is certain that, had the wide-faced *Euryzygoma* survived until to-day, it would have shown to modern eyes one of the most remarkable types ever evolved among the mammalia.

Mr. T. C. Marshall, of the Museum staff, who assisted in the tedious work of putting together the fragments, found that a mixture of Portland cement and glue formed a most effective medium.

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LIST OF WORKS REFERRED TO.

BENSLEY, B. A., 1903.—Evolution of Aust. Marsupialia. Tr. Linn. Soc. Lon., Zool. ix, pp. 83-217.

DAVID, T. W. EDGEWORTH. Fed. Hdbk., Brit. Assn. Mtg. 1914.

DE VIS, 1887a.—On an Extinct Mammal of a Genus apparently new, Proc. Roy. Soc. Qld., iv, pp. 1 to 8, Plates 1-4.

—— 1887b.—On a supposed New Species of *Nototherium*. Proc. Linn. Soc. N.S.W. (2) ii, pp. 1065-1070, Pl. 38.

—— 1888. Note on the Genera *Zygomaturus* and *Nototherium*, Proc. Roy. Soc. Qld. v, pp. 111-116, Plate.

—— 1891.—In confirmation of the genus *Owenia*, Proc. Linn. Soc. N.S.W. (2), vi, pp. 159-165.

—— 1894.—On the Mandible of *Zygomaturus*, Proc. Roy. Soc. Qld., xi.

—— 1907.—*Simoprosobus trilobus*, Ann. Qld. Mus. No. 7, p. 4.

DUNSTAN, B., 1920.—Qld. Geol. Survey, Publ. No. 267.

FORBES, W. A., 1881.—The Anatomy of the Koala, P.Z.S., p. 182.

GREGORY, W. K., 1910.—The Orders of Mammals, Bull. Amer. Mus. Nat. Hist., vol. xxvii.

GLAUERT, L., 1912.—Records West. Aust. Mus. i, pt. 11.

HOGBEN, L. T., 1919.—Progressive Reduction of the Jugal in the Mammalia, P.Z.S.; pp. 71-78.

JACK and ETHERIDGE, 1892.—Geology and Palæontology of Qld.

KREFFT, G., 1882.—Parliamentary Papers: Exploration of the Caves and Rivers of New South Wales.

LONGMAN, H. A., 1915.—On a Giant Turtle, Mem. Qld. Mus. iii, p. 24.

—— 1916.—The supposed Artiodactyle Qld. Fossils, Proc. Roy. Soc. Qld., xxviii, p. 83.

LYDEKKER, R., 1887.—Catalogue Fossil Mammalia, Brit. Mus. Pt. 5.

—— 1889.—*Nototherium* and *Zygomaturus*, Ann. Mag. Nat. Hist. (6), iii, pp. 149-152.

MERRIAM, C. H., 1895.—Pocket Gophers, N. Amer. Fauna, No. 8, U.S. Dept. of Agriculture.

OWEN, R., 1845.—On the Extinct Mammals of Australia, Rep. Brit. Assn, 1844, p. 231.

—— 1859.—*Nototherium*, Quart. Journ. Geol. Soc., xv. pp. 168-186.

—— 1877.—Extinct Mammals of Australia, 2 vols.

PARKER, W. K., 1886.—Structure and Development of the Skull in the Mammalia, Phil. Trans. Roy. Soc., pt. 1.

SCOTT, H. H., 1915.—Monograph of *Nototherium tasmanicum*, Geol. Sur. Rec. Tas. No. 4.

SCOTT, H. H., and C. E. LORD, 1920.—Roy. Soc. Tas., Papers & Proc.

SPENCER, BALDWIN, 1900.—*Wynyardia bassiana*, P.Z.S., pp. 776-795.

STERLING, E. C., 1913.—Identity of *Phascolonus* and *Sceparnodon*, Mem. Roy. Soc. S. Aus., i. pt. 4.

THOMAS, O., 1905.—Nomenclature of Measurements, Proc. Biol. Soc. Wash., p. 192.

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MEMOIRS OF THE QUEENSLAND MUSEUM, VOL. VII, PART III.

(ISSUED NOVEMBER 4, 1921.)

AUSTRALIAN BEES IN THE QUEENSLAND MUSEUM.

BY T. D. A. COCKERELL, UNIVERSITY OF COLORADO.

HYLEOIDES Smith.

Hyleoides striatula n. sp.

Female. Length about 12 mm., anterior wing 10 mm.; clypeus with a very broad orange band, broadest above, where it includes the whole width of clypeus, but ending abruptly some distance before the lower margin; two small transversely elongate orange spots on lower margin of supraclypeal area; lateral face-marks apparently paler, large, cuneiform; antennæ black, the flagellum faintly brownish beneath, extreme apex bright ferruginous; thorax and tegulæ entirely black; costal-field of anterior wings broadly dark fuliginous; legs black, anterior and middle tibiæ rufous in front, middle femora with a suffused red stripe, tarsi reddened at apex; first two abdominal segments entirely black; third orange suffused with red, the base black, with an angular projection in middle line and on each side, the projection of black in middle line approaching a narrow stripe from the hind margin, tending to divide the orange into two parts; fourth segment with two very large transverse orange patches, shaded with red outwardly; fifth black with an obscure orange mark on each side; sixth black; third ventral segment broadly margined with creamy white; first ventral segment nodulose, only about half depth of second, the latter basally truncate, with a broad smooth surface. It also differs from *H. concinna* (Fab.) by the distinctly shining mesothorax, with very minute punctures, and scattered large ones; by the strongly punctured scutellum; by the area of metathorax being distinctly striate in the middle above, and with its posterior face narrower, its outline like that of a convolvulus; by the shining finely punctured first two segments of abdomen, and by the clypeus being very delicately and densely longitudinally striate all over.

Kuranda, Queensland (*Dodd*). One female. A very distinct species, easily known by the sculpture and colour pattern.

Hyleoides bivulnerata n. sp.

Female. Length nearly 11 mm.; clypeus cream colour, with the lower margin black, and with a broad ferruginous band along each side except the upper part; lateral face-marks cuneiform, cream coloured, rather small, not extending below middle of clypeus; face narrowed below; scapa red, flagellum black; upper border of prothorax red, swollen and elevated, but tubercles black; a more or less semilunar red mark behind each tubercle; scutellum with two round red spots; postscutellum black; tegulæ piceous; costal region of wings fuliginous as usual; anterior femora swollen; anterior tibiæ mainly dark red; anterior tarsi peculiar, with much stiff brush-like pale hair; middle and hind legs dark red clouded with black; abdomen with weak rather sparse punctures, the surface feebly shining; first segment red, with the base broadly black, and the hind margin at sides cream colour; second segment very large, and black; third red, black at extreme base, and marked with cream colour apically, especially at sides; remaining segments pale dull red; third ventral segment with a very broad white band, abruptly contracted at sides. It also differs greatly from *H. concinna* by the extremely large and coarse, and partly confluent punctures on mesothorax; the strong punctures on the shining scutellum; the area of metathorax with a pair of large obtuse tubercles; and the clear hyaline wings, aside from the dark costal region of anterior pair. The sculpture of the mesothorax is practically as in *H. waterhousei* Ckll. From *H. concinnula* Ckll. it is easily known by the dark tegulæ, scutellum with only red spots, &c.

Type from Darra, Brisbane, 26-10-15 (*Hacker*). Also one marked Brisbane, 23-11-15 (*Hacker*). The latter differs in having the ferruginous clypeal bands extending nearly to top of clypeus, and marked with a line of black, and in having a small red band along lower margin of supraclypeal area.

REEPENIA (Friese).

Reepenia eboracina (Cockerell).

A male from Gordonvale, North Queensland (no collector's name given), agrees with the type, which is from Cape York. The insect possesses a very remarkable character, hitherto overlooked; the hind wings have a well-developed dark elongate-lanceolate stigma, not far from the apex. It is to be presumed that the same occurs in *R. variabilis* (Friese), the type of the genus, and I think I am accordingly justified in giving *Reepenia* full generic rank. It has hitherto been treated by Friese and myself as a subgenus of *Nomia*. The Australian *Tetralonia brevicornis* Smith is doubtless to be called *Reepenia brevicornis*.

NOMIA Latreille.

Nomia aurantifer swainsoniæ n. subsp.

Female (Type). Like *N. aurantifer*, but with a pale orange band, broadly interrupted in middle, on first abdominal segment; mesothorax and scutellum with short pale grey, and larger fuscous hair; hair of legs largely dull white, but black on outer face of middle tibiæ, hind knees, &c.; wings dusky subhyaline, with the apical margin broadly darkened; hair at sides of first abdominal segment white; dense apical fringe on fifth segment dark chocolate, almost black; venter with white hair.

Male. Similar, except for the usual sexual differences. Flagellum very long, strongly crenulated, black; mandibles chestnut-red in middle; face and front densely covered with cream-coloured hair; mesothorax with much soft pale-grey hair; tegulæ largely reddened; knees and large part of hind tibiæ dark red; hind trochanters with an apical tuft of short red hair; hind femora flat beneath, and evidently swollen subapically; hind tibiæ swollen, with a large apical finger-like projection but no spurs; abdomen with five orange bands, the first very slender and obsolescent in middle.

National Park, Queensland, December, 1919, both sexes at flowers of *Swainsonia galegifolia* R.Br. (*Hacker*). According to the Index Kewensis, *S. galegifolia* is a synonym of *S. coronillæfolia* Salisb. The four specimens before me (two of each sex) indicate that this is a distinct subspecies of *Nomia aurantifer* Ckll., 1910 (syn. *N. luteofasciata* Friese 1917).

Nomia dimissa n. sp.

Male (Type). Like *N. australica reginæ* Ckll., but smaller and more slender (length about 10.5 mm.), with hyaline wings, faintly dusky at apex; hair of face white, hardly perceptibly yellowish; abdomen dark blue, hind tibiæ, seen from behind, with the inner margin strongly angulate below the middle; anterior lobe of hind tibiæ much more broadly truncate. This is not *N. australica regis* Ckll., from which it is at once known by the flagellum being ferruginous beneath, and the abdominal hair-bands strongly yellow.

Female. Length about 10 mm., robust, like *N. australica reginæ*, but smaller, with a large red patch (triangular to subquadrate) on mesothorax in front. Clypeus black or with a very faint reddish stain; flagellum clear ferruginous beneath; disc of mesothorax shining; abdomen very dark, the hair-bands whitish, slightly stained with orange.

Cairns District, Queensland (*F. P. Dodd*) 2 ♀, 1 ♂. These are associated because they come from the same region and collector, but it is peculiar that the male wholly lacks the red mark on mesothorax, whereas I have a male *reginæ* from Kuranda (*Turner*) which has it, though it is dull and inconspicuous. From the size and the colours of the abdomen, this male *reginæ* cannot well be associated with the above females.

Nomia kurandina Cockerell.

Logan Road, Brisbane, 18-9-11 (*Hacker*). One female.

CROCISA Jurine.

Crocisa waroonensis Cockerell.

Two males, Swan R., W. Australia (*J. Clark*).

ANTHOPHORA Latreille.

Anthophora pulchra Smith.

The abdominal bands vary greatly in colour. It would be interesting to determine whether the colours are at all uniform in any one colony:—

(*a*) Bands turquoise blue. Female, Brisbane (7-12-15, *Hacker*). Recalls *A. chlorocyanea* Ckll.

(*b*) Bands pale emerald green. Stradbroke Island; both sexes (5-12-13, *Hacker*).

(*c*) Bands pale brownish golden, with a few emerald-green hairs. Stradbroke Island; male (3-12-12, *Hacker*).

(*d*) Bands white tinged with brownish, the fourth pure white apically. Female. Tambourine Mountain (28-12-11, *Hacker*).

The specimen from Brisbane (*a*) also resembles *A chlorocyanea* in having the hair of thorax above appearing pallid greyish, not strongly reddened; but the legs are as in *pulchra*. The scape in female *chlorocyanea* is entirely black; in *pulchra* (including *a*) it has a yellow stripe or mark.

Anthophóra lilacine n. sp.

Like *A. cingulata* Fab. (*emendata* Sm.), but abdominal bands pale lilac, the first two in the male suffused with ochreous. At first sight this appears to be a mere colour variation, but the fifth ventral segment of the male abdomen has a deep broad rounded emargination, instead of the very shallow one of *cingulata*. The hair on outer side of hind tibiæ is rich orange-fulvous, more or less white at apex.

Kuranda (*Dodd*). Both sexes; the male is the type.

PROSOPIDIDÆ.

Prosopis sculptifrons n. sp.

Male (Type). Length about 11.5 mm.; robust, black, with cream-coloured markings on head and legs, and bright orange markings (tubercles, scutellum, and postscutellum) on thorax. Head very broad, entirely cream-colour on face below antennæ, and lateral face-marks extending nearly to top of orbits, ending very obtusely away from orbits, while the supraclypeal mark is triangularly extended upward between the antennæ; labrum light, and mandibles with an elongate light mark sometimes broken into two; scape greatly swollen, broadly cream-colour in front, flagellum dusky chestnut-red beneath; mandibles small bidentate; front with a very strong keel, on each side of which is a deep sulcus for the scape to rest in; the frontal keel, in a less elevated form, extends downward, to flatten out on apical part of clypeus; supraclypeal area enormously extended laterally, bounding upper part of sides of clypeus, and its convex sides invading the region of lateral marks, and approaching the orbits; vertex and lower part of cheeks with dark hair; mesothorax rather finely and closely punctured, but shining between the punctures; scutellum finely punctured, with a faint median groove; area of metathorax without evident sculpture; metathorax obtusely subtuberculate on each side of truncation; wings dusky, darker in marginal cell and at apex, stigma and nervures piceous; b.n. arched, meeting t.m.; second s.m. very long, receiving the recurrent nervures not far from base and apex; tegulæ black; anterior and middle femora broadened, largely cream colour in front; anterior and middle tibiæ, anterior basitarsi, and middle basitarsi in part cream colour in front; abdomen shining, finely punctured; no ventral tubercles.

Female. Looks just the same, seen from above, but the legs, scape, mandibles, and labrum are entirely black, the flagellum also is black, while the light area on face is bright orange, and is confined to a hat-like supraclypeal mark, and a broad pyriform area on clypeus, including its whole upper end, narrowing below, and ending very obtusely just above clypeal margin.

National Park, Queensland, Dec., 1919, four of each sex (*Hacker*). I thought this might be a *meroglossa*, but the second segment of the female abdomen has not the *meroglossa* base, and the male has not the pointed *meroglossa* tongue, but is a pollen-eater, as a microscopic preparation shows. The female *Palæorhiza*, and doubtless also *meroglossa*, feed on pollen, but the male must be a nectar-feeder. Thus the differences in the tongue are apparently adaptive.

The female *P. sculptifrons* runs in my table of Australian *Prosopis* (Ann. Mag. Nat. Hist. Feb. 1910) to *P. morosa* Smith, to which it is closely allied, differing by the flagellum not being fulvous beneath, and the apical margins of the abdominal segments not discoloured. *P. morosa* is a Southern species from Victoria. Its male is unknown.

Prosopis certa n. sp.

Male (Type). Length about 8 mm.; black, robust, with the whole face below antennæ, and lateral face-marks ending a short distance above (on orbits, at an angle of about 50 degrees), large spot on labrum, tubercles, scutellum, and postscutellum, all very bright lemon-yellow; face broad; mandibles black; tongue very broad and emarginate; cheeks with white hair; scape ordinary, black, punctured; flagellum long, submoniliform, red beneath; face dull and pitted; mesothorax dull and coarsely punctured; tegulæ piceous with a small pale-yellow spot; wings hyaline; b.n. falling short of t.m., first r.n. meeting first t.c., second s.m. long; anterior tibiæ broadly, and middle ones narrowly, fulvous in front, all the basitarsi white; under side of thorax hoary with white hair; abdomen shining but rough, with punctures of two sizes: a strong constriction at junction of first and second segments; apical margin of first ventral segment slightly elevated in middle.

Female. Similar, differing thus:—Labrum entirely black: face-marks confined to broad lateral marks, their upper ends very broad and rounded, a short distance above level of antennæ; legs black, with anterior tibiæ fulvous in front; first r.n. joining first s.m. a little before its end; end of abdomen with black hair. The second abdominal segment is irregularly punctured, the punctures of different sizes.

Brisbane (*Hacker*). Type male 10-10-16; female 12-2-18. In my table, the male runs to 51, and falls with *P. elongata* Sm., from which it is easily separated by the sculpture. The female runs out at 53, disagreeing in the form of the lateral face-marks.

Prosopis daveyi n. sp.

Female. Length about 9 mm.; black, robust, with large lateral face-marks, tubercles and very large areas on scutellum and postscutellum very brilliant orange; flagellum ferruginous beneath. The lateral face-marks fill the space between the high narrow clypeus and the eye, and are squarely truncate at level of antennæ, except that there is a short projection on the outer side, along the orbit ; clypeus with shallow punctures ; mesothorax densely punctured, but shining on disc ; mesopleura rather sparsely punctured ; orange area on scutellum broadly triangular, the corners obtuse ; postscutellum orange except at extreme sides ; tegulæ black ; wings greyish hyaline ; b.n. meeting t.m. ; second s.m. receiving the recurrent nervures very near base and apex ; legs black ; abdomen moderately shining, finely and regularly punctured, the punctures rather sparse on first segment, denser on second, very close on third ; black hair at sides of apex. Base of metathorax rugose.

"Bright V." (*H. W. Davey*). Very close to *P. simillima* Sm., but the face-marks differ, and the face is broad, while the scutellum is only partly yellow.

Palæorhiza viridifrons n. sp.

Female. About 9 mm. long or rather over, robust ; black, with the front, mesothorax, metathorax, and mesopleura green and purple, the metallic colour only conspicuous under a lens ; first abdominal segment bluish green, especially the depressed shining hind margin ; head without light markings ; flagellum dusky ferruginous beneath ; scutellum (but not axillæ), postscutellum, tubercles, and a very large patch behind them, all bright orange ; clypeus elongate, longitudinally striate, and sparsely irregularly punctured ; a shining area on each side between antennæ and eyes ; front densely punctured ; ocelli in a triangle ; mesothorax densely and distinctly punctured ; area of metathorax beautifully green and purple, without evident sculpture ; tegulæ black ; wings brownish, stigma ferruginous, nervures fuscous ; b.n. nearly meeting t.m. ; second s.m. receiving both recurrent nervures, the first a considerable distance from base, the second bent strongly backward ; legs black ; abdomen shining, the first segment finely punctured, densely at sides, the third very much more closely punctured than the second, the latter also with a small dull punctureless area in basal middle ; venter with coarse punctures. Hind spur simple.

Brisbane, 25-5-16 (*Hacker*). Although I have only the female, I am confident that this is a *Palæorhiza*. It runs in my key to *P. parallela* Ckll., from which it is easily known by the general colouration and the dark face.

The above new species, and others with yellow or orange on scutellum and postscutellum, may be separtaed by the following table. I include *Euryglossa aurantifera* Ckll., which was taken by Mr. Hacker at Brisbane, 8-10-18, as it superficially resembles the others. The specimen of *P. aureomaculata subnubilosa* taken by Mr. Hacker has the first recurrent nervure joining the apical corner of first submarginal cell, but the venation in this species is variable. Mr. Meade-Waldo (in litt.) expressed the opinion that *Prosopis nubilosa* Smith should be referred to *Palæorhiza,* with *subnubilosa* as a subspecies. The rediscovery of *Prosopis quadrata* Smith, described from "New Holland," is of interest. The specimen was taken by Mr. Hacker at Oxley, Brisbane, 17-9-14, at Leptm. [*Leptospermum* ?] flowers. It has the minutely reticulated area of metathorax described by Smith. The first recurrent nervure reaches the basal corner of the second submarginal cell, but this character doubtless varies. *P. elongata* Smith is certainly very close, and perhaps not a distinct species; I now have no *elongata* to compare.

An orange patch behind tegulate; no light marks on face; first abdominal segment metallic *Palæorhiza viridifrons* Ckll.
No orange or yellow mark behind tegulæ 1.

1. Face with only minute light marks (National Park, Queensland, Dec., 1919, *Hacker*) *Prosopis nubilosella mediosticta* Ckll., ♀.
Face with conspicuous light marks, or all light 2.

2. No lateral face-marks *P. sculptifrons* Ckll., ♀.
With lateral face-marks 3.

3. Clypeus all dark 4.
Clypeus not all dark 5.

4. Mesothorax posteriorly closely punctured *P. darcyi* Ckll., ♀
Mesothorax posteriorly dull and sparsely punctured *P. certa* Ckll., ♀.

5. Clypeus with only a light spot (National Park, Q., Dec., 1919, *Hacker*) *P. aureomaculata* Ckll., ♀.
Clypeus light, or nearly all light 6.

6. Scape entirely black 7.
Scape light in front 9.

7. Clypeus low and broad; abdomen slightly purplish; yellow patches above tubercles *Euryglossa aurantifera* Ckll.
Clypeus high and narrow 8.

8. Lateral face-marks going above level of antennæ *Prosopis certa* Ckll., ♂.
Lateral face-marks not going above level of antennæ *P. quadrata* Smith.

9. Face very narrow; small species 10.
Face broad; large species *P. sculptifrons* Ckll., ♂.

10. No supraclypeal mark (Brisbane, 6-10-14, *Hacker*) *P. aureomaculata subnubilosa* Ckll., ♂.
Supraclypeal mark present (Brisbane, 26-2-18, *Hacker*) *P. aureomaculata* Ckll., ♂.

The following table separates a series of species which are at least partly metallic, and the scutellum and postscutellum are not yellow. The specimens of *P. albonitens* average larger than those from Mackay—

Thorax black; face entirely black (six from Bribie I., Nov. 1918, *Hacker*) *Prosopis cyaneomicans nigrescens* Ckll.
Thorax metallic 1.

1. Supraclypeal mark present (three from Stradbroke I., Sept. 17, 1915, *Hacker*; one Bribie I., Jan. 1917, *Hacker*) *P. albonitens* Ckll., ♂.
Supraclypeal mark absent 2.

2. Clypeus entirely dark; females (two from Stradbroke I., Sept., 17, 1915, *Hacker*) *P. albonitens* Ckll.
Clypeus at least mainly light; males (Brisbane, 1-9-14 and 8-2-16, *Hacker*; Stradbroke I., 2-10-11, *Hacker*) *P. disjuncta* Ckll.

PARASPHECODES Smith.

Parasphecodes callomelittinus Cockerell, 1910.

This remarkable species was described from Melbourne. One from Bribie Island, 2-11-15 (*Hacker*), differs a little in having the tegulæ reddish, not dark, and the stigma paler than in the type.

CALLOMELITTA Smith.

Callomelitta littleri Cockerell 1914.

Mr. Hacker collected three females and two males of *Callomelitta* in the National Park, Queensland, Dec., 1919. To my surprise, the females are *C. littleri*, and the males *C. nigrofasciata* Ckll., both described from Tasmania. In spite of the differences which led me to regard *nigrofasciata* as a distinct species, I can no longer doubt that it is the male of *littleri*.

MEGACHILE Latreille.

Megachile semiluctuosa Smith.

Mallee, Victoria (*H. W. Davey*). One female.

Megachile mackayensis Cockerell.

National Park, Queensland, Dec., 1919 (*Hacker*). Two females, which have a short line of red hair sublaterally on each side of second and third abdominal segments, in addition to the bright red hair of the apical three segments.

Megachile quinquelineata Cockerell.

Kuranda, Queensland (*Dodd*). One female.

Megachile sequior Cockerell.

Eidsvold (*T. L. Bancroft*). One male.

Megachile canifrons Smith.

Brisbane, 10-10-16 (*Hacker*). One male. Described from Western Australia, but the specimen from Brisbane agrees with the description. It also runs to *canifrons* in Meade-Waldo's table of Smith's species.

Megachile tasmanica Cockerell.

Brisbane, 10-10-16 (*Hacker*) This little species was described from Tasmania in 1916. The male from Brisbane exactly agrees with the type.

Megachile latericauda n. sp.

Male (Type). Length about 11 mm., expanse 17 ; black, with a large apical patch on inner side of anterior tibiæ, and anterior tarsi entirely, bright ferruginous ; head rounded, with broad vertex ; eyes reddish ; face narrow, covered with long white hair, that on upper part of clypeus tinged with yellow ; mandibles black, strongly bidentate ; vertex finely and densely punctured ; antennæ black, slender, not at all expanded at apex (a character separating the species from the related *M. ferox* Sm.); vertex and disc of thorax, including anterior part of scutellum, with dark chocolate hair; hair of occiput, cheeks, thorax anteriorly and posteriorly and at sides, white; mesothorax finely and densely punctured; legs with white hair, fulvous on inner side of hind tarsi; spurs black; anterior tarsi moderately expanded, with a large white area in the middle posteriorly, presenting on the under side a large elongate black mark broadly surrounded by white; third joint also with an elongated lateral lobe; anterior trochanters pointed beneath; anterior coxæ densely covered with white hair in front, not spined; tegulæ black, closely punctured; wings dusky translucent; abdomen parallel-sided, closely punctured; first segment with long white hair; second and third with white hair-bands, broadly interrupted in middle; fourth with a bright ferruginous hair-band, failing at sides; fifth densely covered with bright-red hair, except at extreme sides; sixth without red hair, its transverse keel with two broad rounded lobes, the margins of which are more or less irregular or nodulose.

Female. Face with white hair, but some red hair at apex of clypeus and on mandibles subapically; mandibles tridentate, the outer face strongly grooved; clypeus simple and ordinary, very densely punctured; flagellum obscurely reddish beneath; conspicuous tufts of white hair next to the four corners of mesothorax, and pale hair along its posterior border; wings very smoky; legs entirely black; abdominal segments 1 to 3 with narrow (linear) white hair-bands, expanding into triangular patches at sides of first segment; fifth and sixth segments covered with deep coppery-red hair except at sides; ventral scopa entirely white.

Swan River, W. Australia, one of each sex (*J. Clark*). Near to *M. ferox* but easily separated by the male antennæ, which are like those of *M. erythropyga* Sm., a species having entirely different male tarsi. The female resembles *M. heliophila* Ckll., but differs by the colour of the hair at end of abdomen, the entirely opaque mesothorax, the much more finely punctured clypeus, and the minutely and very densely punctured supraclypeal area. The male carries numerous mites on the posterior part of thorax.

Megachile ciliatipes n. sp.

Male. Length about 9 mm.; extremely near *M. kurandensis* Ckll., but differing thus:—No evident spot of pale hair in front of axillæ; no red or fulvous hair on disc of fifth abdominal segment; anterior tarsi incrassate, especially the basitarsus, and with a fringe of stiff white hair behind; middle tarsi (which in *kurandensis* have black hair on outer side and red on inner, with no white) with silky white hair on outer side, and a very long white fringe behind; hind tarsi with long white hair on each side. The anterior coxæ are spined; face and front densely covered with golden hair; cheeks with pure white hair, tinged with yellow on upper part; vertex and discs of mesothorax and scutellum with black hair; a conspicuous band of pale hair between mesothorax and scutellum; tegulæ black; wings dusky; abdomen with narrow pale fulvous hair-bands, disc of sixth segment above densely covered with fulvous hair.

Type (with pea-green eyes) from Brisbane, 9-4-18 (*Hacker*). Also one (with dark-red eyes, but otherwise the same) from Kuranda (*Dodd*).

Megachile hæmatogastra n. sp.

Female. Length about 11.5 mm., robust, black; ventral scopa bright ferruginous, black on last segment and pale yellow at extreme base; abdomen finely punctured, not at all metallic, segments 2 to 5 with narrow entire fulvous hair-bands; eyes dark reddish; face and front with bright fulvous hair, not covering the clypeus; mandibles broad, dark reddish subapically; clypeus normal, except that the lower margin is thickened and somewhat elevated, and the upper part of disc is convex, highly polished and shining, sparsely punctured, while the lower part is distinctly longitudinally striate, with punctures between the striæ; lower part of supraclypeal area exposed and shining; antennæ black; cheeks with fulvous hair, vertex with black; mesothorax and scutellum finely and extremely densely punctured, the scutellum obtusely pointed at apical middle; thorax with fulvous hair, but short and black on disc of mesothorax, longer and black on scutellum (but a fulvous band between the two), and blackish on disc of mesopleura; tegulæ black; wings dusky; legs black, with partly pale and partly dark hair, on middle basitarsi; dark reddish on outer side, but clear red on inner; hind basitarsi broad, with very bright red hair covering inner side; hind tibiæ with short black hair on outer side, and whitish on inner.

Cairns District (*F. P. Dodd*). Very distinct from the known Australian species, and rather approaching *M. shortlandi* Ckll., from the Solomon Islands.

Megachile mundifica n. sp.

Female. Length about 11.5 mm.; parallel-sided but rather robust; black including legs, antennæ, and tegulæ; eyes blackish; head thick and rounded; sides of face, front, and the broad cheeks with abundant white hair; vertex with scanty brownish hair; mandibles broad, quadridentrate, the base covered with appressed pale silky hair; clypeus coarsely and closely punctured, the middle with a very large squared excavation, within which are golden hairs, and on each side of which the margin has the aspect of a broad rounded lobe; vertex, mesothorax, and scutellum very closely and densely punctured, but glistening; scutellum and disc of mesothorax with red-brown hair; a tuft of clear white hair above the base of each wing; only a very faint hair-band (hardly noticeable) between mesothorax and scutellum; sides of thorax with white hair; wings dusky; legs with white hair, pale reddish on inner side of tarsi; hind basitarsi not broadened; abdomen with creamy-white hair-bands on first three segments, on first interrupted sublaterally and represented at sides by large triangular patches; from apical margin of fourth segment to end the abdomen is covered with pale fulvous hair, redder along margins of fourth and fifth segments; ventral scopa entirely white.

National Park, Queensland, Dec., 1919 (*Hacker*). Resembles *M. recisa* Ckll., known only in the male, but I feel confident that it is not that species. Among the known females it resembles *M. simpliciformis* Ckll., but the clypeus is entirely different.

GASTROPSIS Smith.

Gastropsis victoriæ rufocollaris n. subsp.

Male. Length about 14 mm.; face and front covered with bright ferruginous hair; eyes yellowish green; first three antennal joints clear ferruginous; scape somewhat swollen; mesothorax and scutellum somewhat metallic; anterior part of mesothorax with bright fox-red hair, abruptly separated from the black of the hinder part; anterior tibiæ red in front and black behind; abdominal segments 2 and 3 with white hair-bands along their posterior margins, failing in middle.

Mallee, Victoria (*H. W. Davey*). Two males. The position of *Gastropsis* has been in doubt, but it certainly belongs to the subfamily Diphaglossinæ.

STENOTRITUS Smith.

Stenotritus elegantior n. sp.

Female. Length about 16 mm.; similar to *S. elegans* Sm., but with the following special characters:—Head and thorax above metallic, with rich purple and green tints; hair of face and front fulvous, of cheeks white, contrasting; scape entirely bright ferruginous; legs with long white hair, pale brown on anterior tibiæ and tarsi (red on inner face of tarsi), brownish on middle tarsi and partly so on tibiæ, chocolate colour on inner side of hind tibiæ and tarsi (the basitarsi very broad); abdomen steel-blue, with white hair-bands, interrupted in middle, on first four segments; fifth segment with a heavy rusty-black fringe, the apical middle of which is bright red. The mesothorax and scutellum have black hair on disc, but the mesothorax anteriorly is broadly covered with white hair, having a faint creamy tint.

Queensland, " Hy. 330." From the label, I suspect it is a Turner specimen, from the Mackay region.

PARACOLLETES Smith.

Paracolletes melbournensis Cockerell.

" Bright V." (*H. W. Davey*).

Paracolletes carinatus Smith.

Kuranda (*Dodd*). One male. The very rich purple colour of abdomen may indicate a distinct race, as one would expect from the locality.

Paracolletes plumosus Smith.

" Bright V." (*H. W. Davey*). One female. Hamel, W. Australia, one male. The details of the venation are variable, but I cannot distinguish more than one species.

Paracolletes truncatulus Cockerell.

Stradbroke I., Queensland, 9-9-11.

Paracolletes obscurus Smith.

Kosciusko, 26-1-14 (*A. J. Turner*). The wings are not so brown as in specimens from Mt. Wellington, Tasmania.

Paracolletes chalcurus n. sp.

Female. Length a little over 12 mm.; head and thorax olive-green, bluish green on pleura and sides of face; clypeus strongly but rather sparsely punctured, black, with less than the upper third green; abdomen brassy yellow suffused with crimson, the hind margins of first four segments brilliantly crimson; mandibles black; scape black, long, and curved; flagellum ferruginous at apex, and beneath with the last three joints red and the others marked with red; hair of face, cheeks, and sides of thorax pale grey, of vertex long and blackish, of thorax above long and tinged with fulvous, especially laterally, but partly blackened on disc of mesothorax and scutellum, there being also a vague blackish transverse band from side to side anterior to the tegulæ; mesothorax roughened and closely punctate in front, but the disc posteriorly polished, with few punctures; scutellum polished anteriorly; area of metathorax transversely keeled, with two or three transverse sulci above the keel, but fine oblique and irregular striæ or raised lines below it; tegulæ fulvous, wings hyaline; stigma bright amber colour, nervures dilute sepia; venation as described for *P. roseoviridis*; legs black, with small joints of anterior tarsi, middle and hind tarsi entirely, and hind tibiæ, all reddish; tibial scopa large and loose, whitish below, blackish above; abdomen without hair-bands; first segment with long dull white hair, in middle tinged with ochreous; apex with blackish hair, but tawny on each side of the apical plate, the sides of which are concave; venter with white hair.

Cunderdin, W. Australia, Nov., 1913 (*R. Illidge*). This is very like *P. roseoviridis* Ckll., described from a male about 8 mm. long, and it is possible that the two are sexes of one species. As there is so much difference in size, and the sculpture of the metathorax is not quite the same, I provisionally regard the present insect as distinct.

Paracolletes boroniæ n. sp.

Female. Length about 11 mm.; head and thorax black, abdomen peacock-green, quite brilliant and beautiful, with a rather satiny gloss; hair of head and thorax long, dorsally grey mixed with black, laterally and beneath mainly dull whitish, more or less blackened on clypeus and sides of face; mandibles black; clypeus shining, strongly and rather closely punctured; front dull, somewhat glistening at sides; antennæ black, clear red at extreme apex, and the flagellum very obscurely brownish beneath; mesothorax dull in front but the disc shining, with sparse punctures; area of metathorax dullish with an obtuse transverse ridge, but no keel or distinct sculpture; tegulæ piceous; wings dusky, stigma and nervures piceous; b.n. meeting t.m.; first r.n. joining second s.m. considerably before middle; legs black; tibial scopa black above, white below; abdomen without bands, first segment with thin white hair, apex with black hair, venter with white hair.

Brisbane, 5-9-16 (*Hacker*). Taken at Birkdale, on flowers of *Boronia ledifolia* Gay, much like *P. viridicinctus* Ckll., but the abdomen is quite a different shade of green. *P. viridicinctus* is a Tasmanian species. It may also be compared with *P. versicolor* Sm., but the hair on under side of abdomen is not at all yellow, and there are other differences.

Paracolletes regalis n. sp.

Male. Length about 10 mm.; head and thorax black, abdomen shining deep rich purple, without hair bands; hair of head and thorax dorsally rusty black, but on sides of face, cheeks, and sides of throax white; mandibles black; clypeus exposed, finely and regularly punctured; antennæ long, black, the flagellum very faintly brownish beneath; mesothorax and scutellum polished, with sparse punctures, weak on mesothorax; scutellum with a shallow median sulcus; area of metathorax without evident sculpture, dullish, except the obtuse transverse ridge, which is shining; tegulæ dark reddish; wings dusky, stigma and nervures piceous; b.n. meeting t.m.; second r.n. greatly narrowed above, receiving first r.n. in middle; legs black; abdomen with some black hair apically, and thin white hair on ventral surface.

Kuranda Queensland (*Dodd*). There is a strong brown cloud in the marginal cell and beyond, but it is not at all sharply defined. There is no such cloud in the related *P. recusus*, described below.

Paracolletes facialis n. sp.

Male. Length nearly 9 mm., slender; head, thorax, legs, mandibles, antennæ (which are rather short for a male) and tegulæ black; abdomen shining very dark purplish, with the depressed hind margins of segments more reddish; vertex and discs of mesothorax and scutellum with black hair, but head and thorax otherwise with long white hair, at sides of face dense, appressed, and pure white; clypeus thinly covered with long hair, but the convex shining distinctly punctured surface visible; front dull; mesothorax and scutellum shining, with very weak sparse punctures; scutellum with a distinct median sulcus; area of metathorax mainly shining, without a distinct transverse ridge, but with very delicate cross-striæ; wings faintly dusky, nervures and stigma fuscous; b.n. falling short of t.m.; second s.m. not greatly narrowed above, receiving first r.n. much before the middle; marginal cell obliquely truncate at end; third s.m. very long; legs with white hair; end of abdomen with some black hair.

Coolangatta, Queensland, 15-8-16 (*A. J. Turner*). Resembles *P. regalis* in many respects, but easily separated by the wings. It is extremely like *P. nitidulus* Ckll., but that has a pure black abdomen.

Paracolletes plebeius n. sp.

Female. Length about 10 mm. or a little over; head, thorax, mandibles, and legs black, abdomen shining dark purplish; flagellum dusky chestnut red beneath except at base; hair of vertex, mesothorax, and scutellum black, other hair of head and thorax white; hair at apex of abdomen black; clypeus somewhat shining but not polished, with scattered large punctures; disc of mesothorax shining, with very sparse feeble punctures; scutellum rather strongly but sparsely punctured, with a median sulcus; area of metathorax dull; tegulæ black; wings faintly dusky, not clouded, stigma and nervure dark reddish; b.n. meeting t.m.; second s.m. very broad below, receiving first r.n. at or a little before the middle; tibial scopa black above, white beneath; venter of abdomen with white hair.

"Bright V." (*H. W. Davey*). Very near to *P. providus* Sm., but the head is smaller, the flagellum is differently coloured, and the dark purplish colour of the abdomen is quite different. From *P. frontalis* Sm. it is known by the colour of the scopa.

The next two species are very close to *P. plebeius*, so that at first I hesitated whether to consider them variations of a single species, or to consider all three races of *providus*. I believe, however, that they are really distinct.

Paracolletes incomptus n. sp.

Female. Length about 9 mm.; similar to *P. plebeius*, but smaller, surface of clypeus polished, antennæ entirely dark; wings shorter, quite strongly brownish; stigma with a dark margin, contrasting with the paler centre; scutellum quite without a median sulcus; area of metathorax shining on and below the transverse ridge, but above dullish, with a shallow median groove, and weak transverse striæ; abdomen dark greenish, the same colour as that of *P. providus*, but less polished.

Mundaring, W. Australia, Nov., 1913 (*R. Illidge*). This is easily known from *P. providus* by the smaller size and brownish wings.

Paracolletes recusus n. sp.

Female. Length about 10 mm.; similar to *P. plebeius*, with median sulcus on scutellum and hyaline wings, but antennæ black, surface of clypeus polished, and area of metathorax shining. The abdomen is broad, the segments basally black, with the broad apical margins dark greenish, suggesting the Tasmanian *P. viridicinctus* Ckll., which is, however, quite distinct. There is much resemblance to *P. hackeri* Ckll., om which it differs by the dull anterior half of mesothorax, the total absence of ochreous hair in front of tegulæ, the shining area of metathorax, and the differently coloured abdomen, the segments of which are more broadly depressed apically, and are not distinctly punctured as in *hackeri*.

Tambourine Mountain, Queensland, 27-10-12 (*Hacker*).

Paracolletes apicalis n. sp.

Female. Length about 8 mm., slender for a female; head, thorax, legs, and antennæ black; mandibles with a red subapical spot, and with the inner tooth very slightly developed; tegulæ black, with a brown spot; wings greyish, nervures and stigma piceous; first abdominal segment shining black, without evident punctures, the depressed apical margin chestnut-red; second to fourth segments chestnut-red, black at extreme sides (more widely on second), and the hind margins blackish (broadly black on fourth); fifth segment black, distinctly punctured, the depressed hind margin red, but covered with black hair; apical plate very broad, red in middle. Clypeus shining, strongly but not densely punctured; hair of head and thorax thin, dull white, but dark fuscous on scutellum, vertex, and more or less on mesothorax; front dull except along orbital margins, but laterad of the ocelli the surface is polished and impunctate; mesothorax and scutellum finely and closely punctured, the scutellum without any smooth spaces; area of metathorax with a subsericeous surface, with a delicate median keel, but no distinct transverse ridge or sulci, the surface under the microscope being minutely tessellated; b.n. falling a short distance short of t.m.; second s.m. receiving first r.n. beyond middle; third s.m. long; anterior tibiæ and tarsi with red hair on inner side; tibial scopa thin, blackish above, white below; abdomen dullish, with white hair at sides, and a very imperfectly developed white hair-band on fourth segment, but fifth with black hair.

Swan River, W. Australia, Oct., 1919 (*J. S. Clark*). Not closely related to any known species.

Paracolletes speculiferus n. sp.

Male. Length about 9 mm.; black, including legs, mandibles, and the thick moniliform antennæ, hair of head and thorax dull white, dorsally grey or blackish; middle of front supraclypeal area and clypeus polished and shining, the front with a strong median keel, the supraclypeal area with a faint one, but the middle of clypeus broadly depressed, impunctate and without a keel. Resembles *P. incanescens* Ckll., from Brisbane, but differs thus:—Clypeus and front as just described; area of metathorax very distinctly transversely striate (as in *P. perpolitus* Ckll.); hind tarsi black; abdomen dull, especially basally, the surface microscopically tessellate, with scattered very fine punctures. The venation is nearly as in *P. incanescens*. The wings are greyish.

National Park, Queensland, Dec., 1919 (*Hacker*). One male. Known from *P. perpolitus* Ckll., by the entirely dark antennæ, entirely black anterior tibiæ, &c.

Paracolletes nomadiformis n. sp.

Male. Length about 6.5 mm., abdomen clavate, with narrowed base. Head and thorax black, but lower edge of supraclypeal area, broad clypeal band, and lower part of clypeus broadly ferruginous; clypeus shining, with weak punctures; mandibles dark reddish; antennæ long, entirely ferruginous, the flagellum not moniliform; front and vertex dull; sides of face and front with long pale fulvous hair; mesothorax entirely dull, with very little hair, except a dense fulvous patch at each anterior corner; tubercles covered with fulvous hair, and also scutellum and postscutellum, forming a large dorsal orange-fulvous patch, as in *P. flavomaculatus* Ckll.; area of metathorax dull, without evident sculpture; tegulæ ferruginous; wings reddish, with a darker cloud in marginal cell and beyond; b.n. meeting t.m., first r.n. joining second s.m. before middle; stigma large, fulvous, nervures light fuscous; knees, tibiæ, and tarsi clear ferruginous, hind basitarsi very long; abdomen dull black, with first segment at base and very broadly at apex, and the remaining segments apically, fulvo-ferruginous.

Kuranda, Queensland (*Dodd*). A very distinct species, with the aspect of a *Nomada*. I have thought it permissible, in forming the specific name, to avoid a diphthong in the middle.

Paracolletes aurescens n. sp.

Male. Length about 11 mm.; black, with the long (not moniliform) flagellum light fulvo-ferruginous beneath, the hind margins of the first five abdominal segments broadly reddish-testaceous, and the anterior and middle knees, anterior tibiæ in front and at apex, middle tibiæ at apex and base, hind tibiæ narrowly at apex and broadly at base, and all the tarsi, clear ferruginous. Apical half of mandibles dark reddish; face and front up to and surrounding anterior ocellus, densely covered with long orange-fulvous hair, the uppermost hairs forming a long erect fringe, concealing the lateral ocelli; cheeks with long white hair; thorax above with pale fulvous hair, becoming bright fox-red in front of tegulæ; posteriorly and on sides of thorax the hair is paler, but not white; disc of mesothorax and scutellum shining, with scattered rather small punctures; area of metathorax polished and shining, weakly transversely striate above; tegulæ clear ferruginous; wings clear, faintly dusky apically; nervures and the small narrow stigma dark fuscous; b.n. falling just short of t.m.; second s.m. very broad, receiving first r.n. before the end of its first third; legs with pale hair; anterior femora swollen, with a large oblong depression beneath; discs of abdominal segment with a good deal of pale ochreous-tinted hair; a long silvery-white fringe on each side of apical plate; venter with thin bands of pale fulvous hair.

Bribie Island, Queensland, 1-4-18 (*Hacker*). Allied to *P. colletellus* Ckll., but much longer. On account of the structure of the metathorax, it cannot be the male of *P. waterhousei* Ckll. It is also probably allied to *P. humerosus* Sm., but certainly not its male.

Paracolletes fallax n. sp.

Female. Length about 9 mm.; black, punctured, looking like an *Halictus*, and with the basal nervure strongly arched. Hair of head and thorax short, prevailingly greyish, light reddish on vertex and scutellum, and more or less on mesothorax, tubercles fringed with white hair; mandibles black, inner tooth small; head broad, clypeus broad and flat, with large oval punctures, which are densely placed in middle; front coarsely and very densely punctured; antennæ black, the short flagellum reddish beneath apically; mesothorax and scutellum densely and rather coarsely punctured, but shining between the punctures; postscutellum with a median tuft of spreading hair; area of metathorax with irregular oblique rugæ, especially at sides; tegulæ piceous, partly rufous on outer side; wings strongly dusky, nervures and stigma piceous; b.n. meeting t.m.; second s.m. receiving first r.n. in middle; marginal cell obliquely truncate at end; second s.m. broad, but third a little broader above than second; anterior tibiæ and tarsi with red hair beneath; hind tibial scopa black or blackish above, white beneath; legs, black; abdomen closely and finely punctured; second segment depressed basally; hind margins of segments brown, the third and fourth with shaggy white hair-bands, placed submarginally, the second with bands at sides, and the first with only lateral patches; fifth segment with short fuscous hair, but the usual heavy fringe is absent; pygidial plate large, with convex sides.

Bribie Island, Queensland, 2-11-13 (*Hacker*). Related to *P. punctatus* Sm., but easily separated by the colour of stigma and nervures.

Paracolletes scitulus n. sp.

Male. Length about 8 mm.; black, with hind margins of abdominal segments very obscurely reddish; anterior knees, apical part of femora in front, and their tibiæ in front, all clear ferruginous; middle femora reddened at apex, and their tibiæ at base in front; hind femora and tibiæ and all the tarsi black, except that basal half of anterior basitarsi is red, and the apical joint on all the tarsi is clear red; head broad, with shining white hair at sides of face; middle of front polished and shining (not at all so in *P. nitidulus* Ckll.), vertex also shining; supraclypeal area dull; clypeus convex finely punctured; antennæ long, not moniliform, flagellum (excep basal joint) dark brown beneath; cheeks with long white hair; mesothorax dullish, with scattered very weak punctures, but posteriorly shining scutellum polished and shining, impunctate in middle, with very weak punctures toward the side; area of metathorax convex, shining, without striæ or keel, but the surface is microscopically roughened; abdomen shining, with long white hair on first segment, but without bands; hair at apex pale reddish. There is long dull white hair at sides of thorax posteriorly.

Brisbane, Queensland, 25-9-19 (*Hacker*). One male. Resembles *P. speculiferus*, but easily separated by the clypeus. Superficially, it could be taken for *P. incanescens* Ckll., which also occurs at Brisbane, but the clypeus is different, and the b.n. falls short of t.e., instead of meeting it as in *incanescens*. In both, the first r.n. joins second s.m. in middle, and the tegulæ are alike in both, or perhaps rather redder in *scitulus*.

The following key will facilitate the separation of the species of *Paracolletes* recorded above:—

	At least abdomen more or less metallic	1.
	Non-metallic species	9.
1.	Thorax metallic	2.
	Thorax black	4.
2.	Abdomen brassy, suffused with crimson: comparatively large species	*chalcurus* Ckll.
	Abdomen olive-green	*Melbournensis* Ckll.
	Abdomen blue or purple	3.
3.	Mesothorax purple, with a green area on disc posteriorly	*carinatus* Smith
	Mesothorax green	*plumosus* Smith.
4.	Abdomen bright green	*boroniæ* Ckll.

Abdomen dark or purple 5

5. Marginal cell and beyond with a strong brown cloud ; abdomen rich purple *regalis* Ckll.
Marginal cell, &c., not thus clouded . . . . 6.

6. Male, with brilliant white hair on each side of face . . . . *facialis* Ckll.
Females . . . . 7.

7. Antennæ with flagellum dull red beneath ; area of metathorax dull ; abdomen purplish . . *plebeius* Ckll.
Antennæ with flagellum dark ; area of metathorax shining . . . . 8.

8. Wings brownish ; scutellum with no median sulcus . . . . . *incomptus* Ckll.
Wings clear ; scutellum with a shallow median sulcus . . . . . *recusus* Ckll.

9. Abdomen with at least the middle segments red . . . . . 10.
Abdomen with the middle segments not red . . . . 11.

10. Abdomen entirely red . . . . *truncatulus* Ckll.
Abdomen black at base and apex . . . . *apicalis* Ckll.

11. Abdomen clavate, with broad ferruginous bands . . . . *nomadiformis* Ckll.
Abdomen otherwise . . . . 12.

12. Face with bright golden fulvous hair . . . . . . *aurescens* Ckll.
Face with largely black hair . . . . *obscurus* Smith
Face with white hair 13

13. Abdomen rough and closely punctured ; hind margins of segments broadly brown *fallax* Ckll.
Abdomen smoother and feebly punctured . . . . . . 14.

14. Clypeus ordinary, convex . . . . *scitulus* Ckll.
Clypeus depressed and polished in middle . . . . *speculiferus* Ckll.

CATALOGUE OF AUSTRALIAN BEES.

By Henry Hacker, F.E.S.

The number of bees described from Australia is now very large, being no less than 872 species contained in 50 genera. The list compiled by W. W. Froggatt and published by the Linnean Society of N. S. Wales in 1892 contained 196 species distributed through 31 genera. In this catalogue references of a general character, field notes, or biological notes, are omitted, only hose being given which contain the descriptions of each species, or which deal with the systematic position of these species. The arrangement of divisions and families is taken from the Classification of Rocky Mountain Bees, by Professor T. D. A. Cockerell and W. W. Robbins,† while the genera and species are arranged alphabetically. The species marked with an asterisk are represented in the Museum collection ; with these species also are included all the localities from which the Museum series were obtained. A few species described by F. Smith cannot, after 68 years, be given a more exact habitat than " New Holland," but the majority have been rediscovered and a larger range of localities is now known.

Order HYMENOPTERA

Suborder HETEROPHAGA. Superfamily APOIDEA.

Division COLLETIFORMES. Family COLLETIDÆ.

Genus ANTHOGLOSSA, Sm., MSS., Cat. Hym. B.M., pt 1, p. 16 1853.

Anthoglossa aureotincta Ckll., The Entomologist, xxix, p. 16, 1906.
Hab. : Western Australia.

Anthoglossa cygni Ckll., Ann. Mag. Nat. His. (7), xiv, p. 203, 1904.
Hab. : Swan River, W.A.

Anthoglossa dives Ckll., Ann. Mag. Nat. His. (8), xiv, p. 39, 1914, ♀ ♂.
Hab. : Yallingup, W.A.

***Anthoglossa hackeri** Ckll., Ann. Mag. Nat. His. (8), xii, p. 373, 1913, ♀.
Hab. : Mt. Tambourine, Q.

Anthoglossa plumata Sm., Cat. Hym. B.M., pt. 1, p. 16, 1853.
Hab. : Western Australia.

Anthoglossa sericea Sm., Trans. Ent. Soc. Lond. (3), i, p 59, 1862-64, ♀.
Hab. : Australia.

Genus CLADOCERAPIS, Ckll., Ent. News. Philad., xv, p. 292, 1904.

***Cladocerapis bipectinatus** (Sm.) Genotype.
Lamprocolletes bipectinatus Sm., Trans. Ent. Soc. Lond. Proc., p. 31, 1856.
Lamprocolletes cladocerus Sm., Trans. Ent. Soc. Lond. (3), p. 57, 1862, ♂.
Cladocerapis bipectinatus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 393, 1905.
Hab. : Caloundra, Bribie Island, Q.

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† University of Colorado Studies, vol. vii, No. 3. p. 179, 1910.

Genus GONIOCOLLETES, Ckll., Bull. Amer. Mus. Nat. His. xxiii, p. 231, 1907.

Goniocolletes morsus Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 231, 1907, ♂. Genotype.
Hab. : New South Wales.

Goniocolletes pallidus Ckll., Ann. Mag. Nat. His. (8), xv, p. 345, 1915, ♂.
Hab. : Hermannsburg, Cent. Aust.

Genus NOTOCOLLETES. Ckll., Ann. Mag. Nat. His. (8), xviii, p. 44, 1916.

Notocolletes heterodoxus Ckll., Ann. Mag. Nat. His. (8), xviii, p. 45, 1916, ♂.
Hab. : Gawler Range, S.A.

Genus PARACOLLETES Sm., MSS. Cat. Hym. B.M., pt. 1, p. 6, 1853.

Paracolletes abdominalis Sm., New Sp. Hym. B.M., p. 5, 1879, ♀.
Hab. : Champion Bay, W.A.

Paracolletes abnormis Ckll., Ann. Mag. Nat. His. (8), xviii, p. 46, 1916, ♂.
Hab. : Alexandria, N. Austr.

***Paracolletes advena** (Sm.).
Andrena advena Sm., Trans, Ent. Soc. Lond. (3), i, p. 60, 1862-64, ♀.
Paracolletes advena Ckll., Ann. Mag. Nat. His. (8), iv, p. 314, 1909.
Hab. : Brisbane, Stradbroke Island, Q.

Paracolletes amabilis (Sm.).
Lamprocolletes amabilis Sm., New Sp. Hym. B.M., p. 9, 1879, ♀.
Paracolletes amabilis Ckll., Ann. Mag. Nat. His. (7), xvi, p. 481, 1905, ♀.
Hab. : Queensland.

Paracolletes andreniformis Ckll., Ann. Mag. Nat. His. (8), xv, p. 344, 1915, ♀.
Hab. : Yallingup, W.A.

Paracolletes antennatus (Sm.).
Lamprocolletes antennatus Sm., New Sp. Hym. B.M., p. 10, 1879, ♂.
Hab. : Swan River, W.A.

***Paracolletes apicalis** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 94, 1921, ♀.
Hab. : Swan River, W.A.

Paracolletes argentifrons (Sm.).
Lamprocolletes argentifrons Sm., New Sp. Hym. B.M., p. 11, 1879, ♂.
Paracolletes argentifrons Ckll., *var. A*, Trans. Amer. Ent. Soc., xxxvi, p. 204, 1910.
Hab. : Swan River, W.A.

Paracolletes atronitens Ckll., Ann. Mag. Nat. His. (8), xiv, p. 48, 1914, ♂.
Hab. : Yallingup, W.A.

***Paracolletes aurescens** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 96, 1921, ♂.
Hab. : Bribie Island, Q.

Paracolletes aurifrons (Sm.).
Lamprocolletes aurifrons Sm., Cat. Hym. B.M., i, p. 13, 1853, ♂.
Hab. : Adelaide, S.A.

Paracolletes bicolor (Sm.).
Lamprocolletes bicolor Sm., New Sp. Hym. B.M., p. 10, 1879, ♀.
Paracolletes bicolor Ckll., *var. A*, Trans. Amer. Ent. Soc., xxxvi, p. 201, 1910, ♂.
Paracolletes bicolor Ckll., Ann. Mag. Nat. His. (8), xiv, p. 47, 1914.
Hab. : Swan River, W.A.

Paracolletes bimaculatus (Sm.).
Lamprocolletes bimaculatus Sm., New Sp. Hym. B.M., p. 10, 1879, ♀.
Paracolletes bimaculatus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 478, 1905, ♂.
Paracolletes bimaculatus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 47, 1914, ♂.
Hab. : Swan River, Perth, Yallingup, W.A.

***Paracolletes boroniæ** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 92, 1921, ♀.
Hab. : Birkdale, near Brisbane.

***Paracolletes cæruleotinctus** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 480, 1905, ♂.
Var. A, Trans. Ent. Soc. Amer., xxxvi, p. 204, 1910, ♂.

Hab. : Kuranda, Mackay, Brisbane, Q.

Paracolletes callander Ckll., Ann. Mag. Nat. His. (8), xv, p. 343, 1915, ♀ ♂.
Hab. : Yallingup, W.A.

Paracolletes callurus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 40, 1914, ♀.
Hab. : Yallingup, W.A.

***Paracolletes carinatus** (Sm.).
Lamprocolletes carinatus Sm., Cat. Hym. B.M., i, p. 11, 1853, ♀.
Paracolletes carinatus Ckll., P.L.S. N.S.W., xxxvii, p. 597, 1912, ♂.
Paracolletes carinatus Ckll., Ann. Mag. Nat. His. (8), xi, p. 281, 1913.
Paracolletes carinatus Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 91, 1921.
Hab. : Bathurst, N.S.W. ; Nagambie, V. ; Kuranda, Q. ; Tasmania.

Paracolletes carinatulus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 481, 1905, ♂ ; Bull Amer. Mus. Nat. His., xxiii, p. 230, 1907, ♀.
Hab. : N. S. Wales ; Mackay, Q.

Paracolletes castaneipes Ckll., Ann. Mag. Nat. His. (8), xiv, p. 47, 1914, ♂.
Hab. : Yallingup, W.A.

***Paracolletes chalcurus** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 92, 1921, ♀.
Hab. : Cunderdin, W.A.

***Paracolletes chalybeatus** (Er.).

Andrena chalybeata Erich., Arch. f. Naturg, viii, i, p. 268, 1842, ♀.
Lamprocolletes chalybeatus Sm., Cat. Hym. B.M., i, p. 11, 1853.
Lamprocolletes chalybeatus Sichel., Reise. d. Novarra. Zool., ii, i, p. 144, 1867, ♂.
Hab. : Tasmania.

Paracolletes cinereus (Sm.).

Lamprocolletes cinereus Sm., Cat. Hym. B.M., i, p. 12, 1853, ♀.
Hab. : South Australia.

Paracolletes clypeatus Ckll., Ann. Mag. Nat. His. (8), xviii, p. 52, 1916, ♂ ♀.
Hab. : Yallingup, W.A.

Paracolletes colletellus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 485, 1905, ♂.
Hab. : Adelaide River, N.T.

***Paracolletes crassipes** Sm., Cat. Hym. B.M., i, p. 6, 1853, ♀ : Ckll., Ann. Mag. Nat. His. (8), ix, p. 378, 1912, ♂.
Hab. : Swan River, W.A. ; Leura, Sydney, N.S.W. ; Brisbane, Caloundra, Bribie Island, Q.

Paracolletes crassipes leptospermi Ckll., Ann. Mag. Nat. His. (8), ix, p. 378, 1912, ♂.
Hab. : Mackay, Q.

Paracolletes cristatus (Sm.).

Lamprocolletes cristatus Sm., Cat. Hym. B.M., i, p. 11, 1853, ♀.
Hab. : Australia.

Paracolletes cupreus (Sm.).

Lamprocolletes cupreus Sm., Cat. Hym. B.M., i. p. 13, 1853, ♀.
Hab. : Adelaide, S.A.

Paracolletes dentiger Ckll., Trans. Amer. Ent. Soc. xxxvi, p. 199, 1910, ♀ ; Ann. Mag. Nat. His. (8), xiv, p. 41, 1914, ♂ ♀.
Hab. : Yallingup, W.A.

Paracolletes elegans (Sm.).

Leioproctus elegans Sm., Cat. Hym. B.M., i. p. 9, 1853, ♀.
Hab. : Adelaide, S.A.

Paracolletes erythrurus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 5, 1914, ♂ ♀.
Hab. : Yallingup, W.A.

Paracolletes eucalypti Ckll., Ann. Mag. Nat. His. (8), xviii, p. 51, 1916, ♂.
Hab. : Mt. Yule, Healsville, V.

Paracolletes eugeniarum Ckll., Ann Mag. Nat. His. (8), ix, p. 380, 1912, ♀.
Hab. : Mackay, Q

***Paracolletes euphenax** Ckll., Ann. Mag. Nat. His. (8), xi, p. 279, 1913, ♂.
Hab. : Brisbane, Cleveland, Q.

***Paracolletes facialis** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 93, 1921, ♂.
Hab. : Coolangatta, Q.

***Paracolletes fallax** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 96, 1921, ♀.
Hab. : Bribie Island, Q.

Paracolletes ferricornis Ckll., Ann. Mag. Nat. His. (8), xviii, p. 52, 1916, ♂.
Hab. : Hermannsburg, Cent. Aust.

Paracolletes fervidus Sm., New Sp. Hym. B.M., p. 4, 1879, ♀.
Hab. : Australia.

Paracolletes fervidus subdolos Ckll., Ann. Mag. Nat His. (8), xi, p 279, 1913, ♀.
Hab. : Cheltenham, V.

Paracolletes fimbriatinus Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 202, 1910, ♂.
Hab. : Victoria.

Paracolletes fimbriatinus hillieri Ckll. Ann. Mag. Nat His. (8), xiv, p. 47, 1914, ♂.
Hab. : Hermannsburg, Cent. Aust.

Paracolletes fimbriatus (Sm.).
Lioproctus fimbriatus Sm., New Sp. Hym. B.M., p. 6, 1879, ♀.
Hab. : ?

***Paracolletes flavomaculatus** Ckll. Ann. Mag. Nat His. (7), xvi, p. 479, 1905, ♂; Trans Amer. Ent. Soc., xxxvi, p 201, 1910, ♀
Hab. : Cairns, Kuranda, Stradbroke Island, Q.

Paracolletes frederici Ckll.
Dasycolletes rubellus Sm., Trans. Ent. Soc. Lond (3), i, p. 58 1862-64, ♀.
Lamprocolletes rubellus Sm., Trans. Ent Soc. Lond., p. 253, 1868, ♂.
Paracolletes frederici Ckll., Trans. Amer Ent. Soc. Philad., xxxi, p. 313-364, 1905.
Paracolletes frederici Ckll. Bull. Amer. Mus. Nat. His., xxiii, p. 229, 1907, ♀
Hab. : New South Wales; West Australia.

Paracolletes frontalis (Sm.).
Leioproctus frontalis Sm., Cat. Hym. B.M., i, p. 9, 1853, ♀.
Hab. : Australia.

Paracolletes fulvus Sm.
Lamprocolletes fulvus Sm., New Sp. Hym. B.M., p. 9, 1879, ♀.
Hab. : Queensland.

Paracolletes gallipes Ckll., Ann. Mag. Nat. His. (8), xi, p. 280, 1913, ♀.
Hab. : Poonarunna, S.A.

***Paracolletes hackeri** Ckll., Mem. Queensl. Mus., vi, p. 112, 1918, ♀.
Hab. : Birkdale, Q.

Paracolletes halictiformis Ckll., Proc. Acad. Nat. Sc. Philad., p. 365, 1916, ♀.
Hab. : Yallingup, W.A.

***Paracolletes helichrysi** Ckll., Mem. Queensl. Mus., vi, p. 112, 1918, ♀.
Hab. : Mt. Tambourine, Q.

Paracolletes hobartensis Ckll., Ann. Mag. Nat. His. (7), xvii, p. 23, 1906, ♀.
Hab. : Hobart, T.

Paracolletes humerosus (Sm.).
Dasycolletes humerosus Sm., New Sp. Hym. B.M., p. 11, 1879, ♀.
Hab. : Melbourne, V.

Paracolletes humerosus cyanurus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 140, 1914, ♀.
Hab. : Oakley, V.

Paracolletes ibex Ckll., Ann. Mag. Nat. His. (8), xiii, p. 138, 1914, ♂.
Hab. : Windsor, V.

***Paracolletes incanescens** Ckll., Ann. Mag. Nat. His. (8), xi, p. 277, 1913, ♀ ♂.
Hab. : Brisbane, Stradbroke Island, Q.

***Paracolletes incomptus** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 94, 1921, ♀.
Hab. : Mundaring, W.A.

Paracolletes irroratus (Sm.).
Lamprocolletes irroratus Sm., Cat. Hym. B.M., i, p. 12, 1853, ♀.
Hab. : Port Phillip, V.

***Paracolletes latifrons** Ckll., Ann. Mag. Nat. His. (8), xiv, p. 41, 1914, ♀.
Hab. : Coolangatta, Q.

Paracolletes launcestonensis Ckll., The Entomologist, p. 305, 1914, ♀.
Hab. : Launceston, T.

***Paracolletes leai** Ckll., Proc. Linn. Soc. N.S.W., xxxvii, p. 597, 1912; Ann. Mag. Nat. His. (8), xii, p. 373, 1913, ♀.
Hab. : King Island, Ulverstone, T.; Wilson's Promontory.

***Paracolletes marginatus** Sm., New Sp. Hym. B.M., p. 4, 1879, ♀ ♂; Ckll., Ann. Mag. Nat. His. (8), xi, p. 274, 1913; The Entomologist, p. 305, 1914.
Hab. : Bright, Cheltenham, V.; Bridport, T.

Paracolletes megachalceus Ckll., Ann. Mag. Nat. His. (8), xii, p. 374, 1913, ♀.
Hab. : Clarence River, N.S.W.

***Paracolletes megadontus** Ckll., Ann. Mag. Nat. His. (8), xii, p. 375, 1913, ♀.
Hab. : Caloundra, Stradbroke Island, Bribie Island, Q.

***Paracolletes melbournensis** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 205, 1910, ♀; Ann. Mag. Nat. His. (8), xi, p. 281, 1913.
Hab. : Melbourne, Rutherglen, V.

Paracolletes metallescens Ckll., Ann. Mag. Nat. His. (8), xiv, p. 44, 1914, ♀ ♂.
Hab. : Yallingup, W.A.

Paracolletes mimulus Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 206, 1910, ♀.
Hab. : Victoria.

Paracolletes minutus Ckll., Ann. Mag. Nat. His. (8), xviii, p. 50, 1916, ♂.
Hab. : Yallingup, W.A.

Paracolletes moniliformis Ckll., Ann. Mag. Nat. His. (8), xviii, p. 51, 1916, ♂.
Hab. : Yallingup, W.A.

Paracolletes moretonianus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 477, 1905, ♂.
Hab. : Moreton Bay, Q.

Paracolletes nanus (Sm.).
Lamprocolletes nanus Sm., New Sp. Hym. B.M., p. 9, 1879, ♀.
Hab. : Western Australia.

Paracolletes nigritulus Ckll., Ann. Mag. Nat. His. (8), xviii, p. 48, 1916, ♀.
Hab. : Yallingup, W.A.

Paracolletes nigrocinctus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 6, 1914, ♂.
Hab. : Yallingup, W.A.

Paracolletes nigroclypeatus Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 204, 1910, ♀.
Hab. : Victoria.

Paracolletes nigrofulvus Ckll., Ann. Mag. Nat. His (8), xiii, p. 137, 1914, ♂.
Hab. : Shoalhaven, N.S.W.

Paracolletes nitidulus Ckll., Ann. Mag. Nat. His. (8), xviii, p. 46, 1916, ♀ ♂.
Hab. : Yallingup, W.A.

Paracolletes nitidus Sm., New Sp. Hym. B.M., p. 3, 1879, ♀.
Hab. : N. W. Coast of Australia.

***Paracolletes nomadiformis** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 95, 1921, ♀.
Hab. : Kuranda, Q.

Paracolletes obscuripennis Ckll., Ann. Mag. Nat. His. (7), xvi, p. 484, 1905, ♂.
Hab. : Tasmania.

***Paracolletes obscurus** (Sm.).
Lamprocolletes obscurus Sm., Cat. Hym. B.M., p. 11, 1853, ♀♂.
Paracolletes obscurus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 307, 1905, ♀.
Hab. : Western Australia ; Mt. Wellington, T. : Mt. Kosciusko. V

Paracolletes pachyodontus Ckll., Ann. Mag. Nat. His. (8). xv, p. 529, 1915, ♂.
Hab. : Yallingup, W.A.

Paracolletes perfasciatus Ckll., Ann. Mag. Nat. His. (7). xvii, p. 25, 1906.
Hab : Western Australia.

Paracolletes perpolitus Ckll., Ann. Mag. Nat. His. (8). xviii. p. 49, 1916, ♂.
Hab. : Yallingup, W.A.

Paracolletes platycephalus Ckll., Ann. Mag. Nat. His. (8). ix. p. 379, 1912, ♀; Ann. Mag. Nat. His. (8), xi, p. 276, 1913, ♂.
Hab. : Windsor, V.

***Paracolletes plebeius** Ckll., Mem Queensl Mus., vii. pt. 3, p 94, 1921. ♀.
Hab. : Bright, V.

Paracolletes plumosellus Ckll., Ann. Mag. Nat. His. (7). xvi, p. 480. 1905, ♂.
Hab. : Australia.

***Paracolletes plumosus** (Sm).
Lamprocolletes plumosus Sm., Cat. Hym. B.M . i. p. 12. 1853, ♀.
Paracolletes plumosus Ckll., Trans Amer. Ent. Soc., xxxvi. p. 200. 1910, ♂
Hab. : Swan River. W.A. ; Melbourne, Bright, V.

Paracolletes providellus Ckll., Ann. Mag. Nat. His. (7). xvi. p. 483, 1905. ♂.
Hab. : Australia.

Paracolletes providellus bacchalis Ckll., Ann. Mag. Nat. His. (8), xiii, p. 138, 1914, ♂.
Hab. : Bacchus Marsh, Windsor, V.

Paracolletes providus (Sm.).
Lamprocolletes providus Sm., New Sp. Hym. B.M., p. 8, 1879, ♀.
Paracolletes providus Ckll., *var. A*, Trans. Ent. Soc. Amer. xxxvi, p. 203, 1910, ♀.
Paracolletes providus Ckll., Ann. Mag. Nat. His. (8), xvi, p. 104, 1915, ♂.
Hab. : Port Phillip, V. ; Eaglehawk Neck, T.

Paracolletes punctatus (Sm.).
Lamprocolletes punctatus Sm., Cat. Hym. B.M., i. p. 14, 1853, ♀.
Hab. : Adelaide, S.A.

Paracolletes rebellis Ckll., Ann. Mag. Nat. His. (8), ix, p. 379, 1912, ♂.
Hab. : Melbourne, Woodend, V.

***Paracolletes recusus** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 94, 1921, ♀.
Hab. : Mt. Tambourine, Q.

***Paracolletes regalis** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 93, 1921, ♂.
Hab. : Kuranda, Q.

Paracolletes rhodopus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 46, 1914, ♀.
Hab. : Yallingup, W.A

Paracolletes rudis Ckll., Ann. Mag. Nat. His. (7), xvii, p. 25, 1906. ♀.
Hab. : Swan River, W.A.

Paracolletes ruficornis (Sm.).
Lamprocolletes ruficornis Sm., New Sp. Hym. B.M. p. 10, 1879, ♀.
Hab. : Western Australia.

***Paracolletes scitulus** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 97, 1921, ♂.
Hab. : Brisbane, Q.

Paracolletes semilautus Ckll. Ann. Mag. Nat. His. (7), xvi, p. 485, 1905, ♂.
Hab. : Australia.

***Paracolletes semipurpureus** Ckll.
Paracolletes cupreus semipurpureus Ckll., Ann Mag. Nat. His. (7), xvi, p. 479, 1905, ♀.
Paracolletes cupreus semipurpureus Ckll., *var. A*, Trans. Amer. Ent. Soc., xxxvi, p. 203, 1910, ♂.
Paracolletes semipurpureus Ckll., *var B*, Ann Mag, Nat. His. (8), xiii, p. 139, 1914, ♀.
Hab. : Rutherglen, V. : Mackay, Brisbane, Bribie Island, Q

***Paracolletes semipurpureus ornatissimus** Ckll., Mem. Queensl. Mus., v, p. 200, 1916, ♀ ♂.
Hab. : Oxley, near Brisbane, Q.

Paracolletes sexmaculatus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 43, 1914, ♀ ♂.
Hab. : Yallingup, W.A.

Paracolletes sigillatus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 139, 1914, ♀.
Hab. : South Australia.

Paracolletes simillimus Ckll., Ann. Mag. Nat. His. (8), xviii, p. 48, 1916, ♂.
Hab. : Yallingup, W.A.

Paracolletes subfuscus Ckll., Ann. Mag. Nat. His. (7), xvii, p. 26, 1906, ♂.
Hab. : Adelaide, S.A.

Paracolletes subvigilans Ckll., Ann. Mag. Nat. His. (8), xiv, p. 45, 1914, ♀.
Hab. : Yallingup, W.A.

Paracolletes subviridis Ckll., Ann. Mag. Nat. His. (8), xvi, p. 103, 1915, ♀.
Hab. : Bridport, T.

***Paracolletes speculiferus** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 95, 1921, ♂.
Hab. : National Park, Q.

***Paracolletes tenuicinctus** Ckll., Ann. Mag. Nat. His. (8), xiv, p. 42, 1914, ♀.
Hab. : Yallingup, W.A.

***Paracolletes thornleighensis** Ckll., Ann. Mag. Nat. His. (7), xvii, p. 27, 1906, ♂; Ann. Mag. Nat. His. (8), xi, p. 278, 1913, ♂; Ann. Mag. Nat. His. (8), xiv, p. 42, 1914, ♀.
Hab. : Thornleigh, N.S.W. ; Brisbane, Caloundra, Kuranda, Q.

***Paracolletes truncatulus** Ckll., Ann. Mag. Nat. His. (8), xi, p. 275, 1913, ♀.
Hab. : Blackwood, N.S.W.

Paracolletes tuberculatus Ckll., Ann. Mag. Nat. His. (8), xi, p. 274, 1913, ♀ ♂.
Hab. : Cheltenham, V.

***Paracolletes tuberculatus insularis** Ckll., Ann. Mag. Nat. His. (8), xi, p. 275, 1913, ♀ ♂.
Hab. : Stradbroke Island, Bribie Island, Q.

***Paracolletes turneri** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 203, 1910, ♀.
Hab. : Rutherglen, V. ; Mackay, Brisbane, Q.

Paracolletes versicolor (Sm.).
Lamprocolletes versicolor Sm., Cat. Hym. B.M., i, p. 14, 1853, ♀.
Paracolletes spatulatus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 483, 1905, ♂.
Paracolletes versicolor Ckll., Ann. Mag. Nat. His. (8), xv, p. 529, 1915.
Hab. : Blackheath, N.S.W. ; Adelaide, S.A. ; Mt. Wellington, T.

***Paracolletes vigilans** (Sm.).
Lioproctus vigilans Sm., New Sp. Hym. B.M., p. 7, 1879, ♀.
Paracolletes vigilans Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 199, 1910.
Hab. : Swan River, W.A. ; Launceston, T.

Paracolletes viridicinctus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 482, 1905, ♀.
Hab. : Tasmania.

Paracolletes vitrifrons (Sm.).
Dasycolletes vitrifrons Sm., New Sp. Hym. B.M., p. 11, 1879, ♂.
Hab. : Swan River, W.A.

Paracolletes waterhousei Ckll., Trans. Amer. Ent. Soc. Philad., xxxi, p 313 364, 1905 ; Trans. Amer. Ent. Soc. Philad., xxxvi, p. 204, 1910, ♂
Hab. : Victoria.

Paracolletes worsfoldi Ckll., Ann. Mag. Nat. His. (7), xvii, p. 24, 1906, ♀.
Hab. : Western Australia.

Genus PHENACOLLETES Ckll., Ann. Mag. Nat. His. (7), xvi, p. 301, 1905.

Phenacolletes mimus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 302, 1905, ♂. Genotype.
Hab. : Turtle Bay, N. W Coast, Australia.

Genus TETRALONIA, Spin. Ann. Soc. Ent. Fr., vii, 1838.

Tetralonia convicta Ckll., Ann. Mag. Nat. His. (8), iv, p. 310, 1909, ♂.
Hab. : Port Phillip, V.

Genus TRICHOCOLLETES Ckll., The Entomologist, xlv, p. 176, 1912.

***Trichocolletes venusta** (Sm.). Genotype.
Lamprocolletes venustus Sm., Trans. Ent. Soc. Lond. (3), i, p. 57, 1862, ♀.
Trichocolletes venusta Ckll., Ann. Mag. Nat. His. (8), xi, p. 273, 1913, ♀.
Hab. : Brisbane, Birkdale, Q.

Family PROSOPIDIDÆ.

Genus BINGHAMIELLA Ckll., Bull. Amer. Mus., xxiii, p. 235, 1907.

***Binghamiella antipodes** (Sm). Genotype.
Sphecodes antipodes Sm., Cat. Hym. B.M., i, p. 37, 1853, ♀.
Sphecodes antipus Sichel. Ann. Ent. Fr. (4), v, p. 451, 1865.
Binghamiella antipodes Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 235, 1907, ♀.
Hab. : Sydney, N.S.W. ; Caloundra, Stradbroke Island, Q.

***Binghamiella antipodes insularis** Ckll., Proc. Acad. Nat. Sc. Philad., p. 363, 1916, ♂ ♀.
Binghamiella insularis Ckll., The Entomologist, p. 199, 1914, ♂.
Hab. : George Town, Eaglehawk Neck, T.

Genus CALLOMELITTA Sm., MSS. Cat. Hym. B.M., i, p. 85, 1853.

***Callomelitta littleri** Ckll., The Entomologist, p. 305, 1914, ♀.
Callomelitta nigrofasciata Ckll., Ann. Mag. Nat. His. ( ), i. p. 164, 1918, ♂.
Callomelitta littleri Ckll. Mem. Queensl. Mus. vii, pt. 3, p. 88, 1921.
Hab. : Launceston, T. ; National Park, Q. : Ebor, N.S.W.

Callomelitta picta Sm., Cat. Hym B.M., i, p. 85, 1853, ♀ ♂ ; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 294, 1905 , Ckll., Ann. Mag. Nat. His. (8), viii, p. 289, 1911.
Hab. : Melbourne, V. : Magnet, T.

Callomelitta picta perpicta Ckll., Jour. New York Ent. Soc., xviii, p. 100, 1910, ♂.
Hab.: Ararat, V.

Callomelitta rugosa Ckll., Ann. Mag. Nat. His. (8), xv, p. 345, 1915, ♀.
Hab.: Queensland.

Callomelitta turnerorum Ckll., Ann. Mag. Nat. His. (8), vi, p. 356, 1910, ♀.
Hab.: Cairns, Kuranda, Q.

Genus EUPROSOPIS Perk., Ann. Mag. Nat. His. (8), ix, p. 106, 1912.

***Euprosopis elegans** (Sm.).
Prosopis elegans Sm., Cat. Hym. B M., p. 28, 1853, ♀ ♂.
Prosopis sydneyana Ckll., Ann. Mag. Nat. His. (7), xvi, p. 467, 1905, ♂.
Prosopis elegans Ckll., Ann. Mag. Nat. His. (8), iv, p. 395, 1909.
Euprosopis elegans Perk., Ann. Mag. Nat. His. (8), ix, p. 108, 1912.
Hab.: Timboon, V.; Kenthurst, Wellington, N.S.W.; Brisbane, Q.; Adelaide, S.A.

Euprosopis elegans huseloides (Ckll.).
Prosopis elegans huseloides Ckll., Ann. Mag. Nat. His. (8), v, p. 498, 1910, ♀.
Euprosopis elegans huseloides Perk., Ann. Mag. Nat. His. (8), ix, p. 108, 1912.
Hab.: Townsville, Q.

Euprosopis husela (Ckll.).
Prosopis husela Ckll., Ann. Mag. Nat. His. (8), v, p. 498, 1910, ♀ ♂.
Euprosopis husela Perk., Ann. Mag. Nat. His. (8), ix, p. 107, 1912, ♂.
Hab.: Townsville, Q.

Euprosopis nodosicornis Ckll., Proc. Acad. Nat. Sc. Philad., p. 43, 1913, ♂.
Hab.: Australia.

Genus EURYGLOSSA Sm., MSS. Cat. Hym. B.M., pt. i, p. 17, 1853; Perk., Ann. Mag. Nat. His. (8), ix, p. 109, 1912.

Euryglossa adelaidæ Ckll., Ann. Mag. Nat. His. (7), xvi, p. 475, 1905, ♀.
Hab.: Adelaide, S.A.

Euryglossa albocuneata Ckll., Ann. Mag. Nat. His. (8), xii, p. 510, 1913, ♀.
Hab.: Windsor, V.

Euryglossa altitudinis Ckll., The Entomologist, p. 213, 1914, ♂ ♀.
Hab.: Mt. Lofty, S.A.

***Euryglossa anthracocephala** Ckll., Insecutor Inscitiæ Menstruus, ii, p. 99, 1914, ♀
Hab.: Brisbane, Q.

Euryglossa apicalis Ckll., Ann. Mag. Nat. His. (8), xii, p. 511, 1913, ♂.
Hab.: Croydon, V.

***Euryglossa aurantifera** Ckll., Ann. Mag. Nat. His. (8), ix, p. 143, 1912, ♀.
Hab. : Sydney, N.S.W. ; Brisbane, Q.

Euryglossa aurescens Ckll., Ann. Mag. Nat. His. (8), xii, p. 509, 1913, ♀.
Hab. : Mackay, Q.

Euryglossa bicolor Sm., Trans. Ent. Soc. Lond. (3), i, p. 58, 1862-64, ♀.
Hab. : Adelaide, S.A.

Euryglossa blanda Sm., New Sp. Hym. B.M., p. 13, 1879, ♀.
Hab. : Western Australia.

Euryglossa brachycera Ckll., Ann. Mag. Nat. His. (8), xiv, p. 7, 1914, ♀.
Hab. : Townsville, Q.

Euryglossa calliopsella Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 208, 1910, ♀ ; Ann Mag. Nat. His. (8), viii, p. 290, 1911, ♂.
Hab. : Victoria ; Sydney, N.S.W.

Euryglossa calliopsiformis Ckll., Ann. Mag. Nat. His. (7), xvi, p. 293, 1905, ♀ ; The Entomologist, p. 213, 1914, ♂.
Hab. : Mackay, Q.

Euryglossa carnosa Ckll., Proc. Acad. Nat. Sc. Philad., p. 33, 1913, ♀.
Hab. : Purnong, S.A.

***Euryglossa chrysoceras** Ckll., Jour. New York Ent. Soc., xviii, p. 99, 1910 ; Trans. Amer. Ent. Soc., xxxvi, p. 209, 1910, ♂ ; Ann. Mag. Nat. His. (8), vi, p. 168, 1910, ♂.
Hab. : Victoria : Adelaide, S.A. : Mackay, Brisbane, Q.

Euryglossa cincticornis Ckll., Ann. Mag. Nat. His. (8), xii, p. 511, 1913, ♂.
Hab. : Warburton, V.

***Euryglossa crabronica** Ckll., The Entomologist, p. 142, 1914, ♀.
Hab. : Brisbane, Q.

Euryglossa cupreo-chalybea Sm., Cat. Hym. B.M., i, p. 17, 1853, ♀.
Hab. : Australia.

Euryglossa cygnella Ckll., Ann. Mag. Nat. His. (7), xvi, p. 473, 1905, ♂.
Hab. : Swan River, W.A.

Euryglossa depressa Sm., Cat. Hym. B.M., i, p. 18, 1853, ♀.
Hab. : Australia.

Euryglossa depressa sparsa Ckll., Proc. Acad. Nat. Sc. Philad., p. 363, 1916, ♀.
Hab. : Mount Yule, Healesville, V.

***Euryglossa edwardsii** Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 230, 1907, ♀ ; Mem. Queensl. Mus., v, p. 199, 1916.
Hab. : New South Wales ; Brisbane, Q.

Euryglossa ephippiata Sm., Trans. Ent. Soc. Lond. (3), i, p. 58, 1862-64, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 292, 1905. ♀.
Hab. : Adelaide, S.A. ; Mackay, Q.

Euryglossa euxantha Perk., Ann. Mag. Nat. His. (8), ix, p. 111, 1912, ♀.
Hab. : Port Darwin, N.T.

Euryglossa fasciatella Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 230, 1907, ♀; Ann. Mag. Nat. His. (8), xii, p. 512, 1913, ♂.
Hab. : South Australia ; Cheltenham, V.

Euryglossa flavocuneata Ckll., Ann. Mag. Nat. His. (8), xv, p. 349, 1915, ♀.
Hab. : Yallingup, W.A.

***Euryglossa flavopicta** Sm., New Sp. Hym. B.M., p. 14, 1879, ♀; Ckll., Mem. Queensl. Mus., 5, p. 199, 1916, ♀.
Hab. : Champion Bay, W.A. ; Brisbane, Q.

Euryglossa frenchii Ckll., Ann. Mag. Nat. His. (8), vi, p. 167, 1910.
Hab. : Victoria.

Euryglossa froggattiana Ckll., Ann. Mag. Nat. His. (7), xvi, p. 472, 1905, ♀.
Hab. : Shoalhaven, N.S.W.

Euryglossa furcifera Ckll., Ann. Mag. Nat. His. (8), xi, p. 387, 1913, ♂ ♀.
Hab. : Purnong, S.A.

Euryglossa geminata Ckll., Ann. Mag. Nat. His. (8). viii, p. 289, 1911, ♀
Hab. : Cheltenham, V.

***Euryglossa hæmatura** Ckll., Ann. Mag. Nat. His. (8), viii, p. 289, 1911, ♀; Ann. Mag. Nat. His. (8), xi, p. 281, 1913, ♀.
Hab. : Walcha, N.S.W. ; Brisbane, Q.

Euryglossa halictiformis Sm., New Sp. Hym. B.M., p. 15, 1879, ♀.
Hab. : Swan River, W.A.

Euryglossa halictina Ckll., Ann. Mag. Nat. His. (9). v. p. 117, 1920, ♀.
Hab. : Bridport, T.

Euryglossa hemichlora Ckll., The Entomologist, p. 214, 1914, ♂ ♀.
Hab. : Yallingup, W.A.

***Euryglossa hemixantha** Ckll., Insecutor Inscitiæ Menstruus, ii, p. 99, 1914, ♂.
Hab. : Brisbane, Q.

***Euryglossa hypoleuca** Ckll., Mem. Queensl. Mus., vi, p. 115, 1918, ♂.
Hab. : Brisbane, Caloundra, Q.

Euryglossa inconspicua Ckll., Ann. Mag. Nat. His. (8), xii, p. 512, 1913, ♀.
Hab. : Purnong, V.

Euryglossa jucunda Sm., New Sp. Hym. B.M., p. 13, 1879, ♀; Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 209, 1910, ♀.
Hab. : Champion Bay, Swan River, W.A. : Mackay, Q.

Euryglossa latissima Ckll., The Entomologist, p. 215, 1914, ♀; Ann. Mag. Nat. His. (8), xv, p. 530, 1915, ♂.
Hab. : Eaglehawk Neck, T.

Euryglossa leptospermi Ckll., Ann. Mag. Nat. His. (8), vi, p. 167, 1910, ♀.
Hab. : Mackay, Q.

Euryglossa maculata Sm., New Sp. Hym. B.M., p. 13, 1879, ♀.
Hab. : Swan River, W.A.

Euryglossa melanosoma Ckll., The Entomologist, p. 214, 1914, ♀
Hab. : Yallingup, W.A.

Euryglossa mutica Ckll., Ann. Mag. Nat. His. (8), ix p. 143, 1912, ♂.
Hab : Sydney, N.S.W.

Euryglossa myrtacearum Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 209, 1910, ♀.
Hab. . Mackay, Q.

Euryglossa narifera Ckll., Ann. Mag. Nat. His (8), xv, p. 348, 1915, ♀.
Hab. : Yallingup, W.A.

***Euryglossa neglectula** Ckll., Ann. Mag. Nat His. (7), xvi, p. 474, ♀; Mem. Queensl Mus., v, p. 199, 1916.
Var. A Ckll., Ann. Mag. Nat. His. (8), xi, p. 281, 1913.
Hab. : Brisbane, Q.

Euryglossa neglectula mica Ckll., Mem. Queensl. Mus., vi, p. 116, 1918, ♂.
Hab : Brisbane, Q.

Euryglossa nigra Sm., New Sp. Hym. B.M., p. 13, 1879, ♀.
Hab. : Australia.

Euryglossa nigrocærulea Ckll., Proc. Acad. Nat. Sc. Philad., p. 33, 1913, ♀.
Hab. : Croydon, V. ; Mount Wellington, T.

Euryglossa nitidifrons Sm, New Sp. Hym. B.M., p. 14, 1879, ♀
Hab. : Australia.

Euryglossa nubilipennis Ckll., Ann. Mag. Nat. His. (8), xiv, p. 56, 1914, ♀.
Hab. : Mount Wellington, T.

Euryglossa paupercula Ckll., Ann. Mag. Nat. His. (8), xv, p. 348, 1915, ♀
Hab. : Yallingup, W.A.

Euryglossa pavonura Ckll., Trans. Amer. Ent. Soc., xxxv, p. 211, 1910 ♀
Hab. : Cooktown, Q.

Euryglossa perditiformis Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 207, 1910, ♀.
Hab. : Mackay, Q.

Euryglossa pernana Ckll., Ann. Mag. Nat. His. (7), xvi, p. 474, 1905, ♀.
Hab. : Freemantle, W.A.

Euryglossa perpulchra Ckll., Ann. Mag. Nat. His. (8), xvii, p. 434, 1916, ♂.
Hab. : Kalamunda, W.A.

Euryglossa perpusilla Ckll., The Entomologist, p. 263, 1910, ♀.
Hab. : Mackay Q.

Euryglossa platyrhina Ckll. , Ann. Mag. Nat. His. (8), xv, p. 350, 1915, ♀.
Hab. : Yallingup, W.A.

Euryglossa quadrimaculata Sm., New Sp. Hym. B.M., p. 12, 1879, ♀.
Hab. : Queensland.

***Euryglossa reginæ** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 475, 1905, ♂.
Hab. : Mackay, Brisbane, Q.

Euryglossa rejecta Ckll., Ann. Mag. Nat. His. (7), xvi, p. 476, 1905, ♂.
Hab. : Perth, W.A.

Euryglossa rhodochlora Ckll., Ann Mag. Nat. His. (8), xiv, p. 470, 1914, ♀.
Hab. : Yarrawin, N.S.W.

Euryglossa ridens Ckll., Ann. Mag. Nat. His. (8), xi, p. 388, 1913, ♀.
Hab. : Blue Mountains, N.S.W.

Euryglossa ruberrima Ckll., Proc. Acad. Nat. Sc. Philad., p. 36, 1913, ♀; Ann. Mag. Nat. His. (8), xvii, p. 434, 1916, ♀.
Hab. : Healesville, V.

Euryglossa rubiginosa Dalla Torre.
Euryglossa rubricata Sm., New Sp. Hym. B.M., p. 14, 1879, ♀ (*non* p. 12, No. 3).
Euryglossa rubiginosa D.T., Cat. Hym., x, p. 50, 1896.
Hab. : Swan River, W.A.

Euryglossa rubricata Sm., New Sp. Hym. B.M., p. 12, 1879, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 293. 1905; Ckll., Ann. Mag. Nat. His. (8), vi, p. 167, 1910.
Hab. : Swan River, W.A. ; Mackay, Q.

Euryglossa salaris Ckll., Trans. Ent. Soc. Amer., xxxvi, p. 210, 1910, ♀.
Hab. : Mackay, Q.

Euryglossa sanguinosa Ckll., Proc. Acad. Nat. Sc. Philad., p. 35, 1913.
Hab. : Windsor, V.

Euryglossa schomburgki Ckll., Journ. New York Ent. Soc., xviii, p. 99, 1910, ♀.
Hab. : Adelaide, S.A.

***Euryglossa semicastanea** Ckll., Mem. Queensl. Mus., vi, p. 115, 1918, ♀.
Hab. : Brisbane, Q.

Euryglossa semirufa Ckll., Ann. Mag. Nat. His. (8), xiv, p. 469, 1914, ♀.
Hab. : Yarrawin, N.S.W.

Euryglossa simillima Sm., New Sp. Hym. B.M., p. 12, 1879, ♀.
Hab. : Swan River, W.A.

Euryglossa sinapina Ckll., Proc. Acad. Nat. Sc. Philad., p. 35, 1913, ♂.
Hab. : Purnong, S.A.

Euryglossa sinapipes Ckll., Jour. New York Ent. Soc., xviii, p. 99, 1910, ♂.
Hab. : Adelaide, S.A.

Euryglossa subfusa Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 210, 1910, ♀.
Hab. : Port Darwin, N. T.

***Euryglossa subsericea** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 293, ♀; Ann. Mag. Nat. His. (8), vi, p. 168, 1910, ♀.
Hab. : Mackay, Brisbane.

Euryglossa tasmanica Ckll . Ann. Mag. Nat. His. (9), i, p. 164, 1918, ♀.
Hab. : Launceston, T.

Euryglossa tenuicornis Ckll., Proc. Acad. Nat. Sc. Philad., p. 34, 1913, ♂.
Hab. : Purnong, S.A.

Euryglossa terminata Sm., Cat. Hym. B.M., i, p. 18, 1853, ♀.
Hab. : Australia.

Euryglossa tricolor Sm., New Sp. Hym. B.M., p. 15, 1879, ♀.
Hab. : Swan River, W.A.

Euryglossa tridentifrons Ckll., Ann. Mag. Nat. His. (8), xii, p. 510, 1913, ♂.
Hab. : Nagambie, V.

Euryglossa undulata Ckll., The Entomologist, p. 198, 1914, ♀ ♂.
Hab. : Yallingup, W.A.

Euryglossa variabilis Perk., Ann. Mag. Nat. His. (8), ix, p. 110, 1912, ♂.
Hab. : Bundaberg, Q.

Euryglossa victoriæ Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 207, 1910, ♀.
Hab. : Victoria.

Euryglossa villosula Sm., New Sp. Hym. B.M., p. 15, 1879, ♂.
Hab. : Swan River, W.A.

Euryglossa walkeriana Ckll., Ann. Mag. Nat. His. (7), xvi, p. 473, 1905, ♀.
Hab. : Launceston, T.

Genus EURYGLOSSELLA Ckll., The Entomologist, xliii, p. 263, 1910.

***Euryglossella atomaria** Ckll., Insecutor Inscitiæ Menstruus, ii, p. 100, 1914, ♀.
Hab. : Brisbane, Q.

***Euryglossella globuliceps** Ckll., Mem. Queensl. Mus., vi, p. 116, 1918, ♀.
Hab. : Brisbane, Q.

Euryglossella minima Ckll., The Entomologist, xliii, p. 263, 1910, ♀.
Hab. : Mackay, Q.

Genus EURYGLOSSIDIA Ckll., Ann. Mag. Nat. His. (8), vi, p. 358, 1910.

Euryglossidia ichneumonoides (Ckll.)
Euryglossa ichneumonoides Ckll., The Entomologist, p. 17, 1906.
Euryglossidia ichneumonoides Ckll., Ann. Mag. Nat. His. (8), vi, p. 359, 1910.
Hab. : Western Australia.

Euryglossidia purpurascens Ckll., The Etomologist, p. 197, 1914, ♂.
Hab. : Yallingup, W.A.

Euryglossidia rectangulata Ckll., Ann. Mag. Nat. His. (8), vi, p. 359, 1910, ♀. Genotype.
Hab. : Victoria.

Genus EURYGLOSSINA Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 211, 1911.
(Described as a subgenus.)

***Euryglossina chalcosoma** Ckll., Ann. Mag. Nat. His. (8), xi, p 391, 1913, ♀♂; Insecutor Inscitiæ Menstruus, ii, p. 100, 1914.
Hab. : Croydon, V. ; Brisbane, Q.

Euryglossina cockerelli Perk., Ann. Mag. Nat. His. (8), ix, p. 113, 1912, [illegible].
Hab. : Bundaberg, Q.

Euryglossina flaviventris Ckll., Proc. Acad. Nat. Sc. Philad., p. 362, 1916, ♀♂.
Hab. : Mount Yule, Healesville, V.

Euryglossina fultoni Ckll., Ann. Mag. Nat. His. (8), xi, p. 390, 1913, ♀♂.
Hab. : Purnong, S.A.

Euryglossina hypochroma Ckll., Proc. Acad. Nat. Sc. Philad., p. 362, 1916, ♀.
Hab. : Perth, W.A.

Euryglossina microxantha Ckll., Ann. Mag. Nat. His. (8), xiv, p. 7, 1914, ♀.
Hab. : Mackay, Q.

***Euryglossina perpusilla** Ckll., The Entomologist, xliii, p. 263, 1910, ♀; Insecutor Inscitiæ Menstruus, ii, p. 100, 1914, ♂.
Hab. : Brisbane, Q.

Euryglossina perpusilla var. nana Ckll., Proc. Acad. Nat. Sc. Philad., p. 363, 1916, ♀.
Hab. : Kalamunda, W. A.

Euryglossina proctotrypoides Ckll., Ann. Mag. Nat. His. (8), xi, p. 392, 1913, ♀.
Hab. : Croydon, V.

Euryglossina semipurpurea Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 211, 1910. Genotype.
Euryglossa semipurpurea Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 208, 1910, ♀.
Hab. : Mackay, Q.

Euryglossina sulphurella Ckll., Ann. Mag. Nat. His. (8), xi, p. 389, 1913, ♀♂.
Hab. : Purnong, S.A.

Euryglossina sulphurella var. perlutea Ckll., Ann. Mag. Nat. His. (8), xvii, p. 434, 1916.
Hab. : Kalamunda, W.A.

Euryglossina xanthodonta Ckll., Ann. Mag. Nat. His. (8), xi, p. 391, 1913, ♂.
Hab. : Purnong, S.A.

Genus GNATHOPROSOPIS Perk., Ann. Mag. Nat. His. (8), ix, p. 104, 1912.

***Gnathoprosopis amicula** (Sm.).

Prosopis amicula Sm., New Sp. Hym B.M., p. 19, 1879, ♀ : Ckll., Ann. Mag. Nat. His (7), xvi, p. 467, 1905. : Ckll. Ann. Mag. Nat. His. (8), ix, p. 146, 1912.
Gnathoprosopis amicula Ckll. Mem. Queensl. Mus., v, p. 198, 1916, ♂.
Hab : Champion Bay, W.A. ; Melbourne, V. ; Sydney, N.S.W. ; Brisbane, Mackay, Q.

Gnathoprosopis asinella (Ckll.).
Prosopis asinella Ckll., Proc. Acad. Nat Sc Philad., p 37, 1913, ♂.
Gnathoprosopis asinella Ckll., Mem. Queensl Mus., v, p 198, 1916.
Hab. : Purnong, S.A.

Gnathoprosopis bituberculata (Sm.).
Prosopis bituberculata Sm., New Sp. Hym. B.M., p. 18, 1879, ♂.
Hab. : Melbourne, V.

***Gnathoprosopis euxantha** (Ckll.).
Prosopis xanthopoda Ckll., Ann. Mag. Nat. His. (8), vi, p. 28, 1910. (Not of Vachal, 1895.)
Prosopis euxantha Ckll., Ann. Mag. Nat. His. (8), vi, p. 166, 1910.
Gnathoprosopis euxantha Ckll., Mem. Queensl. Mus., v, p. 198, 1916.
Hab. : Victoria ; Brisbane, National Park, Q.

***Gnathoprosopis hackeri** Ckll., Ann. Mag. Nat. His. (8), x, p. 489, 1912, ♂; Mem. Queensl. Mus., v, p. 198, 1916, ♀.
Hab.: Brisbane, Caloundra, Bribie Island, Q.

Gnathoprosopis rowlandi Ckll., Ann. Mag. Nat. His. (8), xiv, p. 55, 1914, ♂.
Hab.: Yallingup, W.A.

***Gnathoprosopis theodorei** Perk., Ann. Mag. Nat. His. (8), ix, p. 105, 1912, ♂.
Hab.: Townsville, Brisbane, Q.

Genus HETERAPIS Ckll., The Entomologist, xliv, p. 140, 1911.

Heterapis delicata Ckll., The Entomologist, xliv, p. 140, 1911, ♀.
Hab.: Mackay, Q.

Heterapis halictiformis Perk., Ann. Mag. Nat. His. (8), ix, p. 112, 1912, ♂.
Hab.: Bundaberg, Q.

Heterapis sculpta Ckll., The Entomologist, xliv, p. 141, 1911, ♀.
Hab.: Mackay, Q.

Genus HYLEOIDES Sm., MSS. Cat. Hym. B.M., i, p. 32, 1853; Perk., Ann. Mag. Nat. His. (8), ix, p. 108, 1912.

***Hyleoides bivulnerata** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 81, 1921, ♀.
Hab.: Brisbane, Q.; Bamawm, V.

***Hyleoides concinna** (Fabr.).
Vespa concinna Fabr., Syst. Ent., p. 367, 1775.
Hyleoides concinna Sm., Cat. Hym. B.M., i, 32, 1853, ♀.
Hyleoides concinna Ckll., Ann. Mag. Nat. His. (8), iv, p. 310, 1909, ♀♂.
Hab.: Bright, V.; Sydney, N.S.W.; Brisbane, Stradbroke Island, Q.

Hyleoides concinnula Ckll., Ann. Mag. Nat. His. (8), iv, p. 310, 1909, ♀♂: Jour. Ent. Soc. New York, xviii, p. 101, 1910.
Hab.: Adelaide, S.A.; Swan River, W.A.

***Hyleoides striatula** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 81, 1921,. ♂.
Hab.: Kuranda, Q.

Hyleoides waterhousei Ckll., Ann. Mag. Nat. His. (8), xi, p. 387, 1913, ♀.
Hab.: South Australia.

***Hyleoides zonalis** Sm., Cat. Hym, B.M., i, p. 32, 1853, ♀; Ckll., Ann. Mag. Nat. His. (8), iv, p. 310, 1909, ♀.
Hab.: Hunter River, N.S.W.; Swan River, Mundaring, W.A.

Hyleoides zonalis albocincta Ckll., Ann. Mag. Nat. His. (8), iv, p. 309, 1909, ♀.
Hab.: Western Australia.

Hyleoides zonalis rufocincta Ckll., Ann. Mag. Nat. His. (8), iv, p. 310, 1909, ♀♂.
Hab. : Swan River, W.A.

Genus MELITTOSMITHIA Schulz.

Smithia Vachel., Bull. Soc. Ent. Fr., p. 61, 1897 (Præoc.).
Melittosmithia Schulz, Spolia. Hym., p. 244, 1906 (*nom. nov.* for *Smithia*).
Melittosmithia Ckll., Ann. Mag. Nat. His. (8), vi, p. 358, 1910.

Melittosmithia australiensis (Dalla Torre).
Macropis australiensis D.T., Cat. Hym., x, p. 193, 1896.
Scrapter bicolor Sm., Trans. Ent. Soc. Lond. (3), i, p. 61, 1862-64 (*nec* Lepeletier).
Melittosmithia australiensis Ckll., Ann. Mag. Nat. His. (8), vi, p. 358, 1910.
Hab. : Australia.

Melittosmithia carinata (Sm.). Genotype.
Scrapter carinata Sm., Trans. Ent. Soc. Lond. (3), i, p 60, 1862-64.
Melittosmithia carinata Ckll., Ann. Mag. Nat His. (8), vi, p. 358, 1910.
Hab : Australia.

Genus MEROGLOSSA Sm., MSS. Cat. Hym B.M., p. 33, 1853; Perk., Ann. Mag. Nat. His. (8), ix, p. 96, 1912.

Meroglossa baudinensis (Ckll.).
Prosopis baudinensis Ckll., Ann Mag. Nat His (7), xvi, p. 471, 1905. ♀.
Meroglossa baudinensis Ckll., Ann Mag. Nat His. (8), vi, p. 22, 1910.
Hab. : Baudin Island, N.W.A. ; Port Darwin, N.T.

Meroglossa canaliculata Sm., Cat. Hym. B.M., i, p. 33, 1853, ♂.
Hab. : Port Essington, N.T.

Meroglossa deceptor Perk., Ann. Mag. Nat. His (8), ix, p. 101, 1912, ♂.
Hab. : Cairns, Herberton, Q.

Meroglossa decipiens Perk., Ann. Mag. Nat. His. (8), ix, p. 101, 1912, ♂♀.
Hab. : Herberton, Q. ; Port Darwin, N.T.

***Meroglossa desponsa** (Sm.).
Prosopis desponsa Sm., Cat. Hym. B.M., i, p. 31, 1853, ♀.
Prosopis desponsa Ckll., Ann. Mag. Nat. His. (8), ix, p. 146, 1912, ♀.
Meroglossa desponsa Perk., Ann. Mag Nat. His. (8), ix, p. 98, 1912.
Hab. : Heathcote, N.S.W. ; Brisbane, Q.

Meroglossa desponsa var. kershawi Ckll., Proc. Acad. Nat. Sc. Philad., p. 32, 1913, ♀.
Hab. : Victoria.

***Meroglossa diversipuncta** (Ckll.).

Prosopis diversipuncta Ckll., Ann. Mag. Nat. His. (8), iv, p. 395, ♀.

Meroglossa diversipuncta Ckll., Ann. Mag. Nat. His. (8), ix, p. 98, 1912.

Hab.: Kuranda, Q.

Meroglossa eucalypti Ckll., Ann. Mag. Nat. His. (8), vi, p. 18, 1910, ♂♀.

Hab.: Mackay, Q.

Meroglossa impressifrons (Sm.).

Prosopis impressifrons Sm., Cat. Hym. B.M., i, p. 31, 1853, ♂.

Prosopis impressifrons Ckll, Ann. Mag. Nat. His. (8), ix, p. 145, 1912, ♂.

Meroglossa impressifrons Perk., Ann. Mag. Nat. His. (8), ix, p. 98, 1912.

Hab.: Kenthurst, N.S.W.: Brisbane, Q.

Meroglossa lactifera Ckll., Ann. Mag Nat. His. (8), vi, p. 19, 1910, ♂♀.

Hab.: Mackay, Cairns, Q.

***Meroglossa nigrifrons** (Sm.).

Prosopis nigrifrons Sm. Cat. Hym. B.M., i, p. 30, 1853, ♀.

Meroglossa nigrifrons Perk, Ann. Mag. Nat. His. (8), ix, p. 98, 1912.

Hab.: Brisbane, Caloundra, Bribie Island, Q.

Meroglossa nigrifrons var. A, Ckll., Ann. Mag. Nat His. (8), vi, p. 163, 1910, ♀.

Hab.: Victoria.

***Meroglossa penetrata** (Sm.).

Prosopis penetrata Sm., New Sp Hym. B.M., p. 25, 1879.

Meroglossa penetrata Perk, Ann. Mag. Nat. His. (8), ix, p 99, 1912.

Hab.: Brisbane, Stradbroke Island, Townsville, Q.

***Meroglossa penetrata percrassa** (Ckll.).

Prosopis percrassa Ckll., Ann. Mag. Nat. His. (7), xvi, p. 469, 1905, ♀.

Meroglossa penetrata percrassa Ckll., Ann. Mag Nat. His. (8), vi, p. 21, 1910.

Hab.: Mackay, Cairns, Q.

***Meroglossa persulcata** Ckll.

Meroglossa (*sulcifrons* subsp ?) *persulcata* Ckll., Ann. Mag. Nat. His. (8), ix, p. 144, 1912, ♀.

Meroglossa persulcata Ckll., Ann. Mag. Nat. His. (8), x, p. 488, 1912.

Hab.: Brisbane, Caloundra, Q.

Meroglossa rubricata (Sm.).

Prosopis rubricata Sm., New Sp. Hym. B.M., p. 25, 1879, ♀.

Meroglossa rubricata Perk., Ann. Mag. Nat. His. (8), ix, p. 98, 1912.

Hab.: Swan River, W.A.

Meroglossa sculptissima Ckll., Ann. Mag. Nat. His. (8), vi, p. 19, 1910, ♂♀.

Hab.: Mackay, Q.

Meroglossa soror Perk., Ann. Mag. Nat. His. (8), ix, p. 100, 1912, ♀.

Hab.: Herberton District, Q.

Meroglossa sulcifrons (Sm.).
Prosopis sulcifrons Sm., Cat. Hym. B.M., i, p. 27, 1853.
Meroglossa sulcifrons Ckll., Ann. Mag. Nat. His. (8), ix, p 144, 1912.
Hab. : Australia.

Meroglossa torrida (Sm.).
Prosopis torrida Sm., New Sp. Hym. B.M., p. 25, 1879, ♀.
Meroglossa torrida Perk., Ann. Mag. Nat. His. (8), ix, p. 98, 1912.
Hab. : Queensland.

Genus NEOPASIPHÆ Perk., Ann. Mag. Nat. His (8), ix, p. 114, 1912.

Neopasiphæ mirabilis Perk., Ann. Mag. Nat. His. (8), ix, p. 115, 1912, ♂.
Hab. : Western Australia.

Genus PACHYPROSOPIS Perk., Proc. Hawaiian Ent. Soc., ii, p. 29, 1908.

***Pachyprosopis angophoræ** Ckll., Ann. Mag. Nat. His. (8), ix, p. 141, 1912, ♂.
Hab. : Sydney, N.S.W., Brisbane, Q.

Pachyprosopis atromicans Ckll., Proc. Acad. Nat. Sc. Philad., p 37, 1913, ♂ ♀.
Hab. : Murray River, S.A., Croydon, V.

Pachyprosopis barbata Ckll., Insecutor Inscitiæ Menstruus, ii p. 101, 1914, ♂.
Hab. : Brisbane, Q.

Pachyprosopis doddi Ckll., Ann. Mag. Nat. His. (8), vi, p. 167, 1910, ♀.
Hab : Townsville, Q

***Pachyprosopis flavicauda** Ckll., Ann. Mag. Nat. His (8), ix, p. 141, 1912, ♀.
Hab. : Sydney, N.S.W. ; Mount Wellington, T.

***Pachyprosopis hackeri** Ckll., Mem. Queensl. Mus., v, p. 199, 1916, ♀.
Hab. : Brisbane, Q.

***Pachyprosopis hæmatostoma** Ckll., Proc. Acad. Nat. Sc. Philad. p. 36, 1913, ♀ ; Ckll., Ann. Mag. Nat. His. (8), xv, p. 347, 1915.
Pachyprosopis aurantipes Ckll., Ann. Mag. Nat. His. (8), xii, p. 513, 1913, ♂. *Vide* Meade-Waldo's determination.
Hab. : Windsor, Croydon, V. ; Kalamunda, W.A.

Pachyprosopis holoxanthopus Ckll., Ann. Mag. Nat. His (8), xiv, p. 469, 1914, ♂.
Hab. : Yarrawin, N.S.W.

Pachyprosopis humeralis Ckll., Ann. Mag. Nat. His. (8), ix, p. 142, 1912, ♂.
Hab. : Sydney, N.S.W.

***Pachyprosopis indicans** Ckll., Mem. Queensl. Mus., vi, p. 116, 1918, ♂.
Hab. : Brisbane, Q.

Pachyprosopis kellyi Ckll., Ann. Mag. Nat. His. (8), xvii, p. 432, 1916, ♀.
Hab.: Mount Yule, Healesville, V.

***Pachyprosopis mirabilis** Perk., Proc. Hawaiian Ent. Soc., p. 30, 1908; Ckll., Ann. Mag. Nat. His. (8), vi, p. 166, 1910, ♀.
Hab.: Mackay, Caloundra, Brisbane, Q.

Pachyprosopis nitidiceps Ckll., Ann. Mag. Nat. His. (8), ix, p. 384, 1912, ♀.
Hab.: Mackay, Q.

Pachyprosopis obesa Ckll., Ann. Mag. Nat. His. (8), ix, p. 383, 1912, ♀.
Hab.: Sydney, N.S.W.

Pachyprosopis plebeia Ckll., Ann. Mag. Nat. His. (8), vi, p. 166, 1910, ♀.
Hab.: Mackay, Q.

Pachyprosopis saturnina Ckll., Ann. Mag. Nat. His. (8), xi, p 393, 1913, ♀; Proc. Acad. Nat. Sc. Philad., p. 362, 1916.
Hab.: Purnong, S.A.; Perth, W.A.

Pachyprosopis semisericea (Ckll.).
Stilpnosoma semisericea Ckll., Ann. Mag. Nat. His. (7), xvi, p. 476, 1905, ♀.
Pachyprosopis semisericea Ckll., Ann. Mag. Nat. His. (8), vi, p. 167, 1910.
Hab.: Mackay, Q.

Genus PALÆORHIZA Perk., Proc. Hawaiian Ent. Soc., ii, p. 29, 1908; Ann. Mag. Nat. His. (8), ix, p. 102, 1912.

Palæorhiza basilura Ckll., Ann. Mag. Nat. His. (8), v, p. 500, 1910, ♀.
Hab.: Cairns, Kuranda, Q.

Palæorhiza denticauda (Ckll.).
Meroglossa denticauda Ckll., Ann. Mag. Nat. His. (8), vi p. 24, 1910, ♂ ♀.
Palæorhiza denticauda Perk., Ann. Mag. Nat. His. (8), ix, p. 99, 1912.
Hab.: Mackay, Q.

Palæorhiza flavomellea Ckll., Ann. Mag. Nat. His. (8), v, p. 500, 1910, ♀ ♂.
Hab.: Kuranda, Cairns, Q.

***Palæorhiza luxuriosa** (Ckll.).
Meroglossa luxuriosa Ckll., Ann. Mag. Nat. His. (8), vi, p. 22, 1910, ♂ ♀.
Palæorhiza luxuriosa Perk., Ann. Mag. Nat. His. (8), ix, p. 99, 1912.
Hab.: Cairns, Kuranda, Q.

Palæorhiza melanura Ckll., Ann. Mag. Nat. His. (8), v, p. 499, ♂ ♀.
Hab.: Cairns, Kuranda, Q.

***Palæorhiza melliceps** Ckll., Mem. Queensl. Mus., vi, p. 115, 1918, ♀.
Hab.: Brisbane, Tambourine Mountain, Q.

***Palæorhiza parallela** (Ckll.).
Prosopis parallela Ckll., Ann. Mag. Nat. His. (7), xvi. p. 400, 1905, ♀.
Palæorhiza parallela Perk., Ann. Mag. Nat. His. (8), ix, p. 99, 1912.
Hab.: Mackay, Kuranda, Caloundra, Gordonvale, Q.

***Palæorhiza parallela disrupta** Ckll., Insecutor Inscitiæ Menstruus, ii, p. 98, 1914, ♀
Hab.: Kuranda, Port Douglas, Dunk Island, Q.

Palæorhiza parallela var. recessiva Ckll., Ann. Mag. Nat. His. (8), ix p. 149, 1912, ♂.
Hab.: Mackay, Q.

Palæorhiza perkinsi (Ckll.).
Meroglossa perkinsi Ckll., Ann Mag. Nat. His. (8), vi, p 23, 1910, ♂.
Palæorhiza perkinsi Perk., Ann Mag. Nat. His. (8) ix, p. 99, 1912.
Palæorhiza perkinsi Ckll., Jour. New York Ent Soc., xviii, p 98, 1910.
Hab.: Cooktown, Q.

***Palæorhiza perviridis** (Ckll.). Genotype.
Prosopis perviridis Ckll., Ann. Mag. Nat. His. (7), xvi, p. 401, 1905, ♀.
Palæorhiza perviridis Perk., Ann. Mag. Nat. His. (8), ix, p. 99, 1912.
Hab.: Adelaide River, N.T.; Kuranda, Brisbane, Q

Palæorhiza perviridis cassiæfloris (Ckll.).
Meroglossa perviridis cassiæfloris Ckll., Ann. Mag. Nat. His. (8), vi, p. 22, 1910, ♀
Hab.: Mackay, Q.

***Palæorhiza reginarum** (Ckll.)
Prosopis reginarum Ckll., Ann. Mag. Nat His. (7), xvi, p. 402, 1905, ♀.
Meroglossa reginarum Ckll., Ann. Mag. Nat. His. (8), vi, p. 22, 1910, ♂.
Palæorhiza reginarum Perk., Ann. Mag. Nat. His. (8), ix, p. 99, 1912.
Hab.: Mackay, Brisbane, Stradbroke Island, Q.

***Palæorhiza turneriana** (Ckll.).
Prosopis turneriana Ckll., Ann. Mag. Nat. His. (7), xvi, p. 402, 1905, ♂ ♀.
Palæorhiza turneriana Perk., Ann. Mag. Nat. His. (8), ix, p. 99, 1912.
Hab.: Mackay, Kuranda, Q.

Palæorhiza turneriana kurandensis (Ckll.).
Prosopis turneriana kurandensis Ckll., Ann. Mag. Nat. His. (8), iv, p. 394, 1909, ♂.
Meroglossa turneriana kurandensis Ckll., Ann. Mag. Nat. His. (8), vi, p. 21, 1910, ♂.
Hab.: Kuranda, Cooktown, Q.

Palæorhiza turneriana viridimutans (Ckll.).

Meroglossa turneriana viridimutans Ckll., Ann. Mag. Nat. His. (8), vi, p. 21, 1910, ♀.

Hab. : Port Darwin, N.T.

Palæorhiza varicolor (Sm.).

Prosopis varicolor Sm., New Sp. Hym. B.M., p. 24, 1879, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 399, 1905, ♂ ♀.

Palæorhiza varicolor Perk., Ann. Mag. Nat. His. (8), ix, p. 99, 1912.

Hab. : Townsville, Bowen, Q.

Palæorhiza varicolor eboracina (Ckll.).

Meroglossa varicolor eboracina Ckll., Ann. Mag. Nat. His. (8), vi, p. 23, 1910, ♂.

Palæorhiza varicolor eboracina Perk., Ann. Mag. Nat. His. (8), ix, p. 103, 1912; Perk., Ann. Mag. Nat. His. 8), ix, p. 103, 1912, ♂ ♀.

Hab : Cape York, Cairns, Kuranda, Q.

Palæorhiza viridifrons Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 86, 1921, ♀.

Hab. : Brisbane, Q.

Genus PROSOPIS Fabr., Piez. Syst , p. 293, 1804 ; Perkins, Ann. Mag. Nat His. (8), ix, p. 103, 1912.

Prosopisteron Ckll., The Entomologist, xxix, p. 17, 1906.

Prosopisteron merged into *Prosopis* Ckll., Nature, p. 311, 1910.

Prosopis accipitris Ckll., Ann. Mag. Nat. His. (8), xiv, p. 53, 1914, ♂ ♀.

Hab. : Eaglehawk Neck, T.

Prosopis albomaculata Sm., New Sp. Hym. B.M., p. 24, 1879, ♀.

Hab. : Champion Bay, W.A.

***Prosopis albonitens** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 399, 1905, ♂ ; Ann. Mag. Nat. His. (7), xvi, p. 467, 1905, ♀.

Hab. : Mackay, Bribie Island, Stradbroke Island, Q.

***Prosopis alcyonea** Erichs., Wiegm. Arch., p. 267, 1842, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 399, 1905, ♂ ♀; Ann. Mag. Nat. His. (8), vi, p. 30, 1910.

Prosopis vidua Sm., Cat. Hym. B.M., i, p. 29, 1853, ♂.

Hab. : Albany, W.A. : Sydney, N.S.W.

Prosopis amata Ckll., Ann. Mag. Nat. His. (8), iv, p. 394, 1909 ; Ann. Mag. Nat. His. (8), vi, p. 29, 1910.

Hab. : Kuranda, Mackay, Q.

***Prosopis amiculiformis** Ckll., Ann. Mag. Nat. His. (8), iv, p. 394, 1909, ♀; Ann. M. Nat. His. (8), vi, p. 30, 1910, ♂ ; Mem. Queensl. Mus., vi, p. 113, 1918

Hab. : Mackay, Brisbane, Q.

Prosopis ancorata Ckll., Ann. Mag. Nat. His. (8), ix, p. 148, 1912, ♂.

Hab. : Sydney, N.S.W.

Prosopis aposuara Ckll., Ann. Mag. Nat. His. (8), vi, p. 164. 1910, ♂.
Hab. : Gilgai, N.S.W. ; Mackay, Stradbroke Island, Brisbane, Q.

Prosopis aralis Ckll., Proc. Acad. Nat. Sc. Philad., p. 364, 1916, ♀.
Hab. : Mount Yule, Healesville, V.

Prosopis aureomaculata Ckll., Ann. Mag. Nat. His. (8), iv, p. 395, 1909. ♂.
Hab. : Sydney, Como, N.S.W. ; Brisbane, National Park, Caloundra, Q.

Prosopis aurifera Ckll., Mem. Queensl. Mus., vi, p. 113, 1918, ♀.
Hab. : Stradbroke Island, Q.

Prosopis bacillaria Ckll., Insecutor Inscitiæ Menstruus, ii, p. 98. 1914, ♂.
Hab. : Brisbane, Bribie Island, Caloundra, Q.

Prosopis bicolorata Sm., Cat. Hym. B.M., i, p. 27, 1853, ♀.
Hab. : Adelaide, S.A.

Prosopis bidentata Sm., Cat. Hym. B.M., i, p. 28, 1853, ♂. Ckll., Mem. Queensl. Mus., vi, p. 114, 1918.
Hab. : Stradbroke Island, Q.

Prosopis brevior Ckll.
Prosopis perhumilis Ckll., Mem. Queensl. Mus., v, p 197, 1916.
Prosopis brevior Ckll., Ann. Mag. Nat. His. (9), i, p. 164, 1918.
Hab. : Oxley, Brisbane, Q.

Prosopis callosa Ckll . Jour. New York Ent. Soc., xviii, p. 104, 1910, ♂.
Hab. : Port Phillip, V.

Prosopis cassiæ Ckll., Ann. Mag. Nat. His. (8), vi, p. 29, 1910, ♀.
Hab. : Mackay, Q.

Prosopis cenibera Ckll., Ann. Mag. Nat. His. (8), vi, p. 165. 1910 : Insecutor Inscitiæ Menstruus, ii, p. 97, 1914.
Hab. : Mackay, Caloundra, Brisbane, Q.

Prosopis certa Ckll . Mem. Queensl. Mus., vii, pt. 3, p. 85, 1921, ♂ ♀.
Hab. : Brisbane, Q.

Prosopis chlorosoma Ckll., Proc. Acad. Nat Sc. Philad., p. 40, 1913, ♀. Ann. Mag. Nat. His. (9), i, p. 163, 1918.
Hab. : Croydon, V. ; Launceston, T.

Prosopis chromatica Ckll., Ann Mag. Nat. His. (8), ix, p. 382, 1912, ♂ : Mem. Queensl. Mus., vi, p. 113, 1918
Hab. : Mackay, Brisbane, Bribie Island, Q.

Prosopis chrysaspis Ckll., Jour. Ent. Soc. New York, xviii, p. 102, 1910, ♀.
Hab. : Victoria ; Adelaide, S.A.

Prosopis chrysaspis var. A, Ckll., Ann. Mag. Nat. His. (8), vi, p. 25, 1910, ♀.
Hab. : Victoria.

***Prosopis chrysognatha** Ckll., Jour. New York Ent. Soc., xviii, p. 102, 1910, ♂ ♀; Ann. Mag. Nat. His. (8), vi, p. 165, 1910, ♀; Ann. Mag. Nat. His. (8), ix, p. 145, 1912; Proc. Acad. Nat. Sc. Philad., p. 43, 1913, ♂.
Hab.: Adelaide, S.A.; Melbourne, V.; Sydney, N.S.W.; Brisbane, Q.

Prosopis cognata Sm., New Sp. Hym. B.M., p. 18, 1879, ♀ ♂.
Hab.: Champion Bay, Swan River, W.A.

***Prosopis constricta** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 468, 1905, ♂; Ann. Mag. Nat. His. (8), vi, p. 31, 1910; Mem. Queensl. Mus., vi, p. 113, 1918.
Hab.: Mackay, Brisbane, Caloundra, Q.

Prosopis constrictiformis Ckll., Ann. Mag. Nat. His. (8), vi, p. 27, 1910, ♂.
Hab.: Cooktown, Q.

Prosopis coronata Ckll., Ann. Mag. Nat. His. (7), xvi, p. 469, 1905, ♂; Ann. Mag. Nat. His. (8), vi, p. 162, 1910, ♀.
Hab.: Mackay, Q.

Prosopis coronatula Ckll., Ann. Mag. Nat. His. (8), xiv, p. 471, 1914, ♂.
Hab.: Brewarrina, N.S.W.

Prosopis cyaneomicans Ckll., Ann. Mag. Nat. His. (8), xvi, p. 165, 1910, ♀.
Hab.: Mackay, Q.

***Prosopis cyaneomicans var. nigrescens** Ckll., Mem. Queensl. Mus., vi, p. 113, 1918.
Hab.: Bribie Island, Caloundra, Q.

Prosopis cyanophila Ckll., Ann. Mag. Nat. His. (8), vi. p. 28, 1910, ♂.
Hab.: Mackay, Q.

***Prosopis daveyi** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 85, 1921, ♀.
Hab.: Bright, V.

***Prosopis disjuncta** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 400, 1905, ♂; Ann. Mag. Nat. His. (8), vi, p. 30, 1910, ♀; Mem. Queensl. Mus., vi, p. 113, 1918.
Hab.: Mackay, Caloundra, Stradbroke Island, Brisbane, Q.

Prosopis distractus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 56, 1914, ♂.
Hab.: Yallingup, W.A.

Prosopis dromedarius Ckll., Jour. Ent. Soc. New York, xviii, p. 103, 1910, ♂.
Hab.: Adelaide, S.A.

***Prosopis eburniella** Ckll., Ann. Mag. Nat. His. (8), ix, p. 148, 1912, ♂; Mem. Queensl. Mus., v, p. 198, 1916; Mem. Queensl. Mus., vi, p. 113, 1918.
Hab.: Sydney, N.S W.; Brisbane, Stradbroke Island, Caloundra, Q.

Prosopis elongata Sm., New Sp. Hym. B.M., p. 18, 1879, ♂; Ann. Mag. Nat. His. (8), xvii, p. 435, 1916.
Hab.: Victoria; Adelaide, S.A.; Kalamunda, W.A.

***Prosopis eugeniella** Ckll., Ann. Mag. Nat. His. (8), vi, p. 25, 1910, ♀; Mem. Queensl. Mus., vi, p. 113, 1918.
Hab.: Mackay, Brisbane, Q.

Prosopis extensa Ckll., Proc. Acad. Nat. Sc. Philad., p. 364, 1916, ♀.
Hab.: Mount Yule, Healesville, V.

Prosopis flavojugata Ckll., Ann. Mag. Nat. His. (8), ix, p. 146, 1912, ♀.
Hab.: Como, N.S.W.

***Prosopis frederici** Ckll.
Prosopis similis Sm., Cat. Hym. B.M., i, p. 26, 1853. (Not of Fabr., 1793.)
Prosopis frederici Ckll., n.n. Ann. Mag. Nat. His. (7), xvi, p. 403, 1905.
Hab: Brisbane, Q.

Prosopis fulvicornis Sm, Cat. Hym. B.M., i, p. 27, 1853, ♂ not ♀; Ckll., Ann. Mag. Nat. His. (8), xv, p. 347, 1915; Ann. Mag. Nat. His. (8), xvii, p. 435, 1916.
Hab.: Adelaide, S.A.; Kalamunda, W.A.

Prosopis hæmatopoda Ckll., Proc. Acad. Nat. Sc. Philad., p 42, 1913, ♀.
Hab.: South Australia.

Prosopis hobartiana Ckll., Ann. Mag. Nat. His. (7), xvi, p. 470, 1905, ♂.
Hab.: Hobart, T.

Prosopis honesta Sm., New Sp. Hym. B.M., p. 19, 1879, ♂.
Hab.: Tasmania.

Prosopis indicator Ckll., Jour. New York Ent. Soc., xviii, p. 103, 1910, ♂ ♀.
Hab.: Mallee, V.; Adelaide, S.A.

Prosopis infans Ckll. (*microphenax* var. ?), Ann. Mag Nat. His. (8), vi, p. 27, 1910.
Hab.: Mackay, Q.

Prosopis itamuca Ckll., Ann. Mag. Nat. His. (8), vi, p. 163, 1910, ♀.
Hab.: N. W. Australia.

Prosopis kalamundæ Ckll., Ann. Mag. Nat. His. (8), xv, p 346, 1915, ♀.
Hab.: Kalamunda, W.A.

***Prosopis kelvini** Ckll., Ann. Mag. Nat. His. (8), x, p. 489, 1912, ♀.
Hab.: Brisbane, Q.

Prosopis lateralis Sm., New Sp. Hym. B.M., p. 23, 1879, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 467, 1905.
Hab.: Champion Bay, W.A.; Adelaide, S.A.; Mackay, Q.

Prosopis leai Ckll., Ann. Mag. Nat. His. (8), x, p. 490, 1912, ♂.
Hab.: National Park, N.S.W.

Prosopis leucosphæra Ckll., Proc. Acad. Nat. Sc. Philad., p. 42, 1913, ♀.
Hab. : Croydon, V.

Prosopis littleri Ckll., Ann. Mag. Nat. His. (9), i, p. 163, 1918, ♂.
Hab. : George Town, T.

Prosopis lubbocki Ckll.
Prosopis metallica Sm., Trans. Ent. Soc. Lond., p. 59, 1862, ♂ not ♀
Prosopis lubbocki Ckll., n.n. Ann. Mag. Nat. His. (7), xvi, p. 403, 1905.
Hab. : Australia.

Prosopis mediovirens Ckll., Proc. Acad. Nat. Sc. Philad., p. 39, 1913, ♀ ♂ ; Ann. Mag. Nat. His. (9), i, p. 163, 1918, ♂.
Hab. : Purnong, S.A. ; Launceston, T.

*__Prosopis melanops__ Ckll., Mem. Queensl. Mus., v, p. 198, 1916, ♀.
Hab. : Caloundra, Brisbane, Q.

Prosopis microphenax Ckll., Ann. Mag. Nat. His. (8), vi, p. 26, 1910, ♂.
Hab. : Mackay, Q.

Prosopis microphenax var. A Ckll., Ann. Mag. Nat. His. (8), vi, p. 26, 1910, ♂.
Hab. : Mackay, Q.

Prosopis minuscula Ckll., Proc. Acad. Nat. Sc. Philad., p. 38, 1913, ♂.
Hab. : Croydon, V.

*__Prosopis morosa__ Sm., New Sp. Hym. B.M., p. 26, 1879, . ; Ckll., Ann. Mag. Nat. His. (8), ix, p. 146, 1912, ♀.
Hab. : Liverpool Plains, Como, N.S.W. ; Brisbane, National Park, Q.

Prosopis nigropersonata Ckll., Ann. Mag. Nat. His. (8), vi, p. 27, 1910, ♀.
Hab. : Mackay, Q.

*__Prosopis nubilosa__ Sm., Cat. Hym. B.M., i, p. 31, 1853, ♀. Ckll., Ann. Mag. Nat. His. (8), vi, p. 25, 1910
Hab. : Port Phillip, V. ; Brisbane, Stradbroke Island, Caloundra, Q.

Prosopis nubilosa subnubilosa Ckll., Ann. Mag. Nat. His. (8), vi, p. 25, 1910, ♀ ; Ann. Mag. Nat. His. (8), vi, p. 161, 1910, ♂.
Hab. : Mackay, Q.

Prosopis nubilosella Ckll., Ann. Mag. Nat. His. (8), vi, p. 161, 1910, ♀.
Hab. : Mackay, Q.

*__Prosopis nubilosella mediosticta__ Ckll., Ann. Mag. Nat. His. (8), ix, p. 145, 1912, ♀ ; Mem. Queensl. Mus., vi, p. 113, 1918.
Hab. : Botany, N.S.W. ; Stradbroke Island, National Park, Q.

*__Prosopis obtusata__ Sm., New Sp. Hym. B.M., p. 17, 1879, ♀.
Hab. : Swan River, W.A. ; Brisbane, Stradbroke Island, Q.

Prosopis pachygnatha Ckll., Ann. Mag. Nat. His. (8), vi, p. 29, 1910, ♀.
Hab. : Cooktown, Mackay, Q.

***Prosopis perhumilis** Ckll., Ann. Mag. Nat. His. (8), xiv, p. 53, 1914, ♂ ♀; Ann. Mag. Nat. His. (9), i, p. 163, 1918.
Hab. : Yallingup, W.A. ; Brisbane, Q.

***Prosopis perhumilis var. A,** Ckll., The Entomologist, p. 306, 1914, ♂.
Hab. : Bridport, Launceston, T.

Prosopis permiranda Ckll., Ann. Mag. Nat. His. (8), iv, p. 396, 1909, ♀.
Hab. : Kuranda, Q.

***Prosopis perplexa** (Sm.).
Prosopis confusa Sm., Cat. Hym. B.M., i, p. 30, 1853, ♀ (*non* Nylander).
Prosopis perplexa Sm., Cat. Hym. B.M., ii, p. 421, 1854.
Prosopis perplexa Ckll. Ann. Mag. Nat. His. (8), ix, p. 146, 1912, ♀.
Hab. : Mosman's Bay, Hornsby, N.S.W. ; Bribie Island Q.

Prosopis philoleuca Ckll., Ann. Mag. Nat His. (8), vi, p. 163, 1910, ♀.
Hab. : Mackay, Q.

Prosopis primulipicta Ckll., Ann. Mag. Nat. His (7), xvi, p 471, 1905, ♂.
Hab. . Mackay, Q.

Prosopis proxima Sm., New Sp. Hym. B M., p. 24, 1879, ♀.
Hab. : Champion Bay, W.A.

Prosopis proxima var. A Ckll., Proc Acad. Nat Sc Philad., p. 43, 1913, ♀.
Hab. : Purnong, S.A.

Prosopis pulchricrus Ckll., Ann. Mag Nat. His. (8), xv, p. 266, 1915, ♂.
Hab. : Yarrawin, N.S.W.

***Prosopis pulchripes** Ckll., Insecutor Inscitiæ Menstruus, ii, p. 97 1914, ♂.
Hab. : Brisbane, Caloundra, Q.

Prosopis purpurata Sm., New Sp. Hym. B.M., p 17, 1879, ♂.
Hab. : Adelaide, S.A.

***Prosopis quadrata** Sm., Cat. Hym. B.M., i, p. 28, 1853, ♂.
Hab. : Brisbane, Q.

Prosopis quadriceps Sm., New Sp. Hym. B.M., p. 17, 1879, ♀.
Hab. : Australia.

Prosopis quadriceps var. A Ckll., Ann. Mag. Nat. His. (8), ix, p. 145, 1912.
Hab. : New South Wales.

Prosopis rollei Ckll., Jour. New York Ent. Soc., xviii, p. 105, 1910, ♂; Ann. Mag. Nat. His. (8), vi, p. 162, 1910.
Hab.: Ararat, V.

Prosopis rotundiceps Sm., New Sp. Hym. B.M., p. 19, 1879, ♀; Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 235, 1907, ♂.
Hab.: Melbourne, V.

Prosopis ruficeps Sm., Cat. Hym. B.M., i, p. 29, 1853, ♀.
Hab.: Adelaide, S.A.

Prosopis rufipes Sm., Cat. Hym. B.M., i, p. 27, 1853, ♀; Ckll., Jour. New York Ent. Soc., xviii, p. 101, 1910, ♂.
Hab.: Australia.

Prosopis sanguinipicta Ckll., Ann. Mag. Nat. His. (8), xiv, p. 54, 1914, ♂.
Hab.: Yallingup, W.A.

Prosopis scintilla Ckll., Ann. Mag. Nat. His. (8), ix, p. 147, 1912, ♀; Ann. Mag. Nat. His. (8), xiv, p. 54, 1914, ♂.
Hab.: Mackay, Q.

Prosopis scintilliformis Ckll., Proc. Acad. Nat. Sc. Philad., p. 41, 1913, ♀; Proc. Acad. Nat. Sc. Philad., p. 365, 1916, ♀ ♂.
Hab.: Croydon, Healesville, V.

***Prosopis sculptifrons** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 84, 1921, ♂ ♀.
Hab.: National Park, Q.

***Prosopis serotinella** Ckll., The Entomologist, xxix, p. 17, 1906; Ann. Mag. Nat. His. (8), vi, p. 25, 1910, ♀; Mem. Queensl. Mus., vi, p. 113, 1918.
Hab.: Mackay, Brisbane, Q.

Prosopis simillima Sm., New Sp. Hym. B.M., p. 26, 1879, ♀.
Hab.: Moreton Bay, Q.

Prosopis sublateralis Ckll., Ann. Mag. Nat. His. (8), xiv, p. 471, 1914, ♂.
Hab.: Yarrawin, N.S.W.

Prosopis subplebeia Ckll., Ann. Mag. Nat. His. (7), xvi, p. 469, 1905, ♂.
Hab.: Mackay, Q.

Prosopis trilobata Ckll., Jour. New York Ent. Soc., xviii, p. 104, 1910, ♂.
Hab.: Mallee, V.

Prosopis trimerops Ckll., Proc. Acad. Nat. Sc. Philad., p. 365, 1916, ♀.
Hab.: Yallingup, W.A.

Prosopis varicolor Sm., New Sp. Hym. B.M., p. 24, 1879, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 399, 1905, ♂.
Hab.: Port Bowen, Townsville, Q.

Prosopis violacea Sm., Cat. Hym. B.M., i, p. 26, 1853, ♀ ♂.
Hab. : Swan River, W.A.

Prosopis vittatifrons Ckll., Proc. Acad. Nat. Sc. Philad., p. 39, 1913, ♀; Proc. Acad. Nat. Sc. Philad., p. 365, 1916.
Hab. : Purnong, S.A. ; Perth, W.A.

Prosopis xanthaspis Ckll., Ann. Mag. Nat. His. (8), vi, p. 160, 1910, ♀; Ckll., Ann. Mag. Nat. His. (8), ix, p. 147, 1912, ♂.
Prosopis xanthaspis var. *bicuneata* Ckll., Ann. Mag. Nat. His. (8), viii, p. 769, 1911, ♀.
Prosopis bicuneata Ckll., Ann. Mag. Nat. His. (8), vi, p. 161, 1910, ♀.
Hab. : Mackay, Q.

Prosopis xanthosphæra Ckll., Proc. Acad. Nat. Sc. Philad., p. 41, 1913.
Hab. : King Island, T.

Genus STILPNOSOMA Sm., New Sp. Hym. B.M., p. 16, 1879.

Stilpnosoma lævigatum Sm., New Sp. Hym. B.M., p. 16, 1879, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 296, 1905, ♀.
Hab. : Mackay, Q.

***Stilpnosoma semisericea** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 476, 1905, ♀.
Hab. : Mackay, Birkdale, Q.

Stilpnosoma turneri Friese., Arkiv. för. Zool. Band ii, p. 4, 1917, ♀.
Hab. : Mackay, Colosseum, Q. ; Adelaide S.A.

Genus TURNERELLA Ckll., The Entomologist, xliii, p. 262, 1910.

Turnerella doddi Perk., Ann. Mag. Nat. His. (8), ix, p. 114, 1912, ♀.
Hab. : Port Darwin, N.T.

Turnerella gilberti Ckll., The Entomologist, xliii, p. 262, 1910, ♂.
Hab. : Mackay, Q.

Division ANDRENIFORMES.

Family ANDRENIDÆ. Subfamily NOMIINÆ.

Genus NOMIA Latr., His. Nat., xiii, p. 369, 1805.

Nomia ænea Sm., Trans. Ent. Soc. Lond., p. 63, 1875, ♂.
Hab. : Port Essington, N.T.

Nomia aerata Sm., Trans. Ent. Soc. Lond., p. 63, 1875, ♂.
Hab. : Australia.

Nomia alboscopacea Friese., Arkiv. för. Zool. Band ii, p. 6, 1917, ♂.
Hab. : Mackay, Colosseum, Atherton, Q.

Nomia argentifrons Sm., Trans. Ent. Soc. Lond. (3), i, p. 60, 1862-54
Hab. : Australia.

Nomia aurantifer Ckll., Ann. Mag. Nat. His. (8), v, p. 501, 1910, ♀.
Hab. : Cairns, Kuranda, Q.

***Nomia aurantifer swainsoniæ** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 82, 1921, ♀ ♂.
Nomia luteofasciata Friese., Arkiv. för. Zool. Band ii, p. 7, 1917, ♀.
Hab. : National Park, Cairns, Atherton, Q.

***Nomia australica** Sm., Trans. Ent. Soc. Lond., p. 60, 1875, ♂ ♀.
Hab. : Melbourne, V. : Brisbane, Stradbroke Island, Q. ; Adelaide, S.A. ; Swan River, W.A.

***Nomia australica regis** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 221, 1910, ♂.
Hab. : N.W. Australia.

***Nomia brisbanensis** Ckll., Ann. Mag. Nat. His. (8), xii, p. 508, 1913, ♀ ♂.
Hab. : Brisbane, Stradbroke Island, Bribie Island, Q.

Nomia darwinorum Ckll., Ann. Mag. Nat. His. (8), v, p. 502, 1910, ♂.
Hab. : Port Darwin, N.T.

Nomia dentiventris Sm., Trans. Ent. Soc. Lond . p. 62, 1875, ♂.
Hab. : Sydney, N.S.W.

***Nomia dimissa** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 83, 1921, ♀ ♂.
Hab. : Cairns, Q.

***Nomia ferricauda** Ckll., Ann. Mag. Nat. His. (8), xii, p 507, 1913, ♀.
Hab. : Brisbane, Q.

***Nomia flavoviridis** Ckll., The Entomologist, p. 222, 1905 , Trans. Amer. Ent. Soc , xxxvi, p. 225, 1910, ♀ ♂; The Entomologist, p. 119, 1912.
Hab. : Mackay, Brisbane, Stradbroke Island, Bribie Island, Q.

Nomia flavoviridis adelaidella Ckll., Jour. New York Ent. Soc., xviii, p. 106, 1910, ♂ ♀.
Hab. : Adelaide, S.A.

Nomia flavoviridis cyanella Ckll., Ann. Mag. Nat. His. (8), xii, p. 506, 1913, ♂.
Hab. : Cooktown, Q.

Nomia flavoviridis var. doddi Ckll., The Entomologist, p. 222, 1905.
Hab. : Queensland.

***Nomia flavoviridis phanerura** Ckll., Ann. Mag. Nat. His. (8), xii, p. 506, 1913, ♀.
Hab. : Mackay, Brisbane, Stradbroke Island, Sandgate, Q.

Nomia frenchi Ckll., The Entomologist, p. 120, 1912, ♂.
Hab. : Woodend, V.

Nomia generosa Sm., Trans. Ent. Soc. Lond., p. 61, 1875, ♂.
Hab. : Moreton Bay, Q.

Nomia gilberti Ckll., Ann. Mag. Nat. His. (7), xvi, p. 304, 1905, ♀.
Hab. : Mackay, Q.

***Nomia gracilipes** Sm., Trans. Ent. Soc. Lond., p. 61, 1875, ♀ ♂ : Westw., Trans. Ent. Soc. Lond., p. 217, 1875, ♂ : Ckll., Ann. Mag. Nat. His. (8), xii, p. 507, 1913, ♀ ; Ckll., Mem. Queensl. Mus., v, p. 200, 1916, ♀.
Hab. : Victoria ; Brisbane, Q. ; Adelaide, S.A.

Nomia grisella Ckll. (*muscosa*, subsp. ?), Ann. Mag. Nat. His. (8), xii, p. 508, 1913, ♀.
Hab. : Cape York, Q.

***Nomia halictella** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 306, 1905, ♀ ; The Entomologist, p. 122, 1912, ♂ : Mem. Queensl. Mus., vi, p. 116, 1918.
Hab. : Mackay, Brisbane, Q.

Nomia halictella var. triangularis Ckll., Ann. Mag. Nat. His. (7), xvi, p. 307, 1905, ♀.
Hab. : Mackay, Q.

Nomia hippophila Ckll., Jour. New York Ent. Soc., xviii, p. 106, 1910, ♂ ; The Entomologist, p. 158, 1916, ♀.
Hab. : Port Phillip, V. ; Yarrawin, N.S.W.

Nomia hippophila purnongensis Ckll., Ann. Mag. Nat. His. (8), xii, p. 505, 1913, ♂.
Hab. : Purnong, S.A.

Nomia hypodonta Ckll., The Entomologist, p. 220, 1905.
Var. A, Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 223, 1910, ♂.
Hab. : Mackay, Q.

***Nomia kurandina** Ckll. Trans. Amer. Ent. Soc., xxxvi, p. 222, 1910, ♂ ; The Entomologist, p. 121, 1912, ♀.
Hab. : Cairns, Mackay, Brisbane, Q.

Nomia lepidota Ckll., The Entomologist, p. 218, 1905.
Hab. : Australia.

***Nomia lyonsiæ** Ckll., Ann. Mag. Nat. His. (8), x, p. 491, 1912, ♀.
Hab. : Brisbane, Stradbroke Island, Q.

Nomia melanoptera Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 224, 1910. ♀.
Hab. : Cairns, Kuranda, Q.

Nomia moerens Sm., Trans. Ent. Soc. Lond., p. 60, 1875, ♀ ; Ckll., Ann. Mag. Nat. His. (8), xii, p. 507, 1913, ♀.
Hab. : Victoria.

***Nomia muscosa** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 224, 1910, ♀ ; Ann. Mag. Nat. His. (8), xii, p. 505, 1913, ♂.
Hab. : N. S. Wales ; Mackay, Brisbane, Stradbroke Island, Q.

Nomia nana Sm., Trans. Ent. Soc. Lond., p. 62, 1875, ♀.
Nomia ruficornis Sm., Trans. Ent. Soc. Lond., p. 62, 1875, ♂.
Nomia nana Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 221, 1910, ♂.
Hab. : Adelaide, S.A. ; Sydney, N.S.W. ; N. W. Australia.

Nomia pseudoceratina Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 222, 1910, ♂.
Hab. : Mackay, Q.

Nomia rubroviridis Ckll., The Entomologist, p. 223, 1905.
Hab. : Australia.

Nomia rufocognita Ckll., The Entomologist, p. 219, 1905.
Hab. : Kuranda, Q.

***Nomia satelles** Ckll., The Entomologist, p. 120, 1912, ♂ ♀.
Hab. : Rutherglen, V. ; Kurrajong, N.S.W.

Nomia semiaurea Ckll., Ann. Mag. Nat. His. (7), xvi, p. 305, 1905, ♀ ; The Entomologist, p. 121, 1912.
Hab. : Mackay, Kuranda, Q.

Nomia semipallida Ckll., The Entomologist, p. 220, 1905.
Hab. : Australia.

Nomia stalkeri Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 223, 1910, ♂.
Hab. : Alexandria, Australia.

Nomia subaustralica Ckll., Jour. New York Ent. Soc., xviii, p. 105, 1910, ♀.
Hab. : Finke River, Tennant's Creek, S.A.

***Nomia submoerens** Ckll., The Entomologist, p. 307, 1914, ♀.
Hab. : Bridport, Eaglehawk Neck, George Town, T.

Nomia tenuihirta Ckll., The Entomologist, p. 219, 1905 ; Ann. Mag. Nat. His. (7). xvi, p. 304, 1905, ♂ ♀.
Hab. : Mackay, Q.

***Nomia tomentifera** (Friese).
Nomia cincta var. *tomentifera* Friese., Ann. Mus. Hung., p. 191-207, 1909.
Nomia tomentifera Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 222, 1910, ♂.
Hab. : Kuranda, Cooktown, Dunk Island, Q.

Nomia victoriæ Ckll., Jour. New York Ent. Soc., xviii, p. 107, 1912, ♀.
Hab. : Ararat, V.

Genus NOMIOIDES Schenck., Berlin, Entom. zeitschr., x, p. 333, 1866.

Nomioides perditellus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 221, 1905, ♀ ; Trans. Amer. Ent. Soc., xxxvi, p. 245, 1910, ♂.
Hab. : Mackay, Q.

Genus REEPENIA Friese. (no reference obtainable).

Reepenia brevicornis (Sm.).

Tetralonia brevicornis Sm., Cat. Hym. B.M., ii, p. 303, 1854, ♂.

Reepenia brevicornis Ckll., Mem. Queensl. Mus. vii, pt. 3, p. 81, 1921.

Hab. : Moreton Bay, Q.

***Reepenia eboracina** Ckll.

Nomia (*Reepenia*) *eboracina* Ckll., Ann. Mag. Nat. His. (8), ix, p. 377, 1912, ♂.

Reepenia eboracina Ckll., Mem. Queensl. Mus. vii, pt. 3, p. 81, 1921, ♂.

Hab. : Cape York, Gordonvale, Q.

Subfamily HALICTINÆ.

Genus HALICTUS Latr., His. Nat., xiii, p. 364, 1805.

(Including Subgenus *Chloralictus* Rob., Canad. Ent., xxxiv, p. 248, 1902.)

Halictus asperithorax Ckll., Ann. Mag. Nat. His. (8), vi, p. 274, 1910, ♀.

Hab. : Melbourne, V.

Halictus bassi Ckll., Ann. Mag. Nat. His. (8), xvi, p. 102, 1915, ♂.

Hab. : Mount Wellington, T.

Halictus baudini Ckll., Ann. Mag. Nat. His. (8), xvi, p. 102, 1915, ♂.

Hab. : Mount Wellington, T.

Halictus behri Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 228, 1910, ♀.

Hab. : Port Darwin, N.T.

Halictus behri transvolans Ckll., Ann. Mag. Nat. His. (8), ix, p. 385, 1912.

Hab. : Mackay, Q.

***Halictus bicingulatus** Sm., Cat. Hym. B.M., i, p. 57, 1853, ♀.

Var. A Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 231, 1910, ♀ ; Ckll., Ann. Mag. Nat. His. (8), xiii, p. 508, 1914.

Hab. : Melbourne, V ; Mackay, Brisbane. Q.

***Halictus bicingulatus var. leai** Ckll.

Halictus leai Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 237, 1910, ♀.

Halictus leai Ckll., Proc. Acad. Nat. Sc. Philad,. p. 32, 1913, ♂.

Halictus bicingulatus var. *leai* Ckll., Ann. Mag. Nat. His. (8), xiii, p. 508, 1914.

Hab. : Brisbane, Q.

***Halictus blackburni** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 232, 1910, ♂ ♀.

Hab. : Mackay, Q.

Halictus blighi Ckll., Ann. Mag. Nat. His. (8), xvi, p. 102, 1915, ♂.

Hab. : Mount Wellington, T.

Halictus boweni Ckll., Ann. Mag. Nat. His. (8), xvi, p. 103, 1915. ♂.

Hab. : Eaglehawk Neck, T.

Halictus brazieri Ckll., Proc. Acad. Nat. Sc. Philad., p. 367, 1916, ♂.
Hab. : Yallingup, W.A.

***Halictus brisbanensis** Ckll., Mem. Queensl. Mus., vi, p. 117, 1918, ♀.
Hab. : Brisbane, Q.

Halictus burkei Ckll., The Entomologist, p. 58, 1906.
Hab. : Tasmania.

***Halictus bursariæ** Ckll., Mem. Queensl. Mus., v, p. 203, 1916, ♂.
Hab. : Brisbane, Caloundra, Q.

***Halictus callaspis** Ckll., Ann. Mag. Nat. His. (8), xvi, p. 6, 1915, ♀.
Hab. : Bribie Island, Q.

***Halictus caloundrensis** Ckll., Ann. Mag. Nat. His. (8), xiii, p. 505, 1914, ♀.
Hab. : Caloundra, Bribie Island, Q.

Halictus cambagei Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 236, 1910, ♂.
Hab. : Adelaide, S.A.

Halictus carbonarius Sm., Cat. Hym. B.M., i, p. 58, 1853, ♀.
Hab. : Sydney, N.S.W.

Halictus cassiæfloris Ckll., Ann. Mag. Nat. His. (8), xiii, p. 514, 1914, ♀.
Hab. : Mackay, Q.

Halictus chapmani Ckll., Ann. Mag. Nat. His. (8), vi, p. 273, 1910, ♀.
Hab. : Western Australia.

Halictus circumdatus Ckll., Ann Mag. Nat. His. (8), xiii, p. 512, 1914, ♀.
Hab. : Rutherglen, V.

***Halictus clarigaster** Ckll., Mem. Queensl. Mus., vi, p. 117, 1918, ♀.
Hab. : Caloundra, Q.

Halictus clelandi Ckll., Ann. Mag. Nat. His. (8), vi, p. 272, 1910, ♂.
Hab. : Adelaide, S.A.

***Halictus cognatus** Sm., Cat. Hym. B.M., i, p. 59, 1853, ♂.
Hab. : Launceston, T.

Halictus confusellus Ckll., Proc. Acad. Nat. Sc. Philad., p. 374, 1916, ♀.
Hab. : Launceston, T.

Halictus conspicuus Sm., New Sp. Hym. B.M., p. 34, 1879, ♀.
Hab. : Australia.

Halictus convexus Sm., New Sp. Hym. B.M., p. 35, 1879, ♀.
Hab. : Victoria.

Halictus cyclognathus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 511, 1914, ♂.
Var. A Ckll., Ann. Mag. Nat. His. (8), xvi, p. 97, 1915, ♂.
Hab. : Eaglehawk Neck, T. : Croydon, V.

***Halictus cyclurus** Ckll., Ann. Mag. Nat. His. (8), xvi, p. 99, 1915, ♀.
Hab. : Mount Tambourine, Q.

***Halictus (Chloralictus) dampieri** Ckll., The Entomologist, p. 270, 1905; Trans. Amer. Ent. Soc., xxxvi, p. 228, 1910, ♂; Ann. Mag. Nat. His. (8), ix, p. 385, 1912.
Hab. : Mackay, Kuranda, Cairns, Brisbane, Stradbroke Island, Q.

Halictus davidis Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 234, 1910, ♂ ♀.
Hab. : Cairns, Kuranda, Q.

Halictus demissus Ckll., Proc. Acad. Nat. Sc. Philad., p. 371, 1916, ♀.
Hab. : Launceston, T.

Halictus disclusus Ckll., The Entomologist, p. 243, 1914, ♂.
Hab. : South-east Tasmania.

***Halictus doddi** Ckll., Ann. Mag. Nat. His. (8), xiv, p. 368, 1914, ♀.
Hab. : Kuranda, Q.

Halictus dolichocerus Ckll., Proc. Acad. Nat. Sc. Philad., p. 370, 1916, ♂.
Hab. : Yarrawin, N.S.W.

Halictus dotatus Ckll., Ann. Mag. Nat. His. (8), ix, p. 384, 1912, ♀.
Hab. : Sydney, N.S.W.

***Halictus eboracensis** Ckll., Mem. Queensl. Mus., vi, p. 117, 1918, ♀.
Hab. : Ebor, N.S.W.

***Halictus erythrurus** Ckll., Ann. Mag. Nat. His. (8), xiii, p. 504, 1914, ♀; Ann. Mag. Nat. His. (9), i, p. 165, 1918; Mem. Queensl. Mus., vi, p. 116, 1918; Ann. Mag. Nat. His. (9), iii, p. 125, 1919, ♀.
Hab. : Croydon, V. ; Launceston, T. ; York, W.A. ; Brisbane, Q.

***Halictus erythrurus var. atrocyaneus** Ckll., Mem. Queensl. Mus., vi, p. 117, 1918, ♀.
Hab. : Brisbane, Q.

Halictus etheridgei Ckll., Ann. Mag. Nat. His. (8), xvii, p. 433, 1916, ♀.
Hab. : Yallingup, W.A.

Halictus eurhodopus Ckll. Ann. Mag. Nat. His. (8), xiii, p. 514, 1914, ♀.
Hab. : Cairns, Kuranda, Q.

Halictus ewarti Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 230, 1910, ♀.
Hab. : Cairns, Kuranda, Q.

Halictus expansifrons Ckll., Ann. Mag. Nat. His. (8), xiii, p. 521, 1914, ♂.
Hab. : N.S.W.

***Halictus eyrei** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 226, 1910, ♀; Mem. Queensl. Mus., vi, p. 116, 1918.
Hab. : Mackay, Brisbane, Caloundra, Q.

Halictus flindersi Ckll., The Entomologist, p. 271, 1905.
Var. A Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 228, 1910.
Hab. : Mackay, Q.

Halictus flindersi leucurus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 366, 1914, ♀.
Hab. : Bribie Island, Q.

Halictus floralis Sm., Cat. Hym. B.M., i, p. 57, 1853, ♀.
Hab. : Australia.

***Halictus forresti** Ckll., The Entomologist, p. 60, 1906; Trans. Amer. Ent. Soc., xxxvi, p. 232, 1910, ♂; Ann. Mag. Nat. His. (8), ix, p. 385, 1912.
Hab. : Mackay, Q.

Halictus forticornis Ckll., Proc. Acad. Nat. Sc. Philad., p. 372, 1916, ♂.
Hab. : Kalamunda, W.A.

Halictus furneauxi Ckll., Ann. Mag. Nat. His. (8), xvi, p. 101, 1915, ♀.
Hab. : Eaglehawk Neck, T.

Halictus gilesi Ckll., The Entomologist, p. 304, 1905.
Hab. : Australia.

Halictus globosus Sm., Cat. Hym. B.M., i, p. 59, 1853.
Hab. : Tasmania.

Halictus granulithorax Ckll., Ann. Mag. Nat. His. (8), xiii, p. 519, 1914, ♀.
Hab. : Victoria.

***Halictus griseovittatus** Ckll., Ann. Mag. Nat. His. (8), xiii, p. 509, 1914, ♀.
Hab. : Mackay, Brisbane, Q.

***Halictus hackeriellus** Ckll., Ann. Mag. Nat. His. (8), xiii, p. 507, 1914, ♂.
Hab. : Brisbane, Q.

***Halictus hæmatopus** Ckll., The Entomologist, p. 307, 1914, ♂.
Hab. : Launceston, T.

Halictus hæmatostoma Ckll., Ann. Mag. Nat. His. (8), xiii, p. 506, 1914, ♂.
Hab. : Windsor, V.

Halictus hedleyi Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 231, 1910, ♂.
Var. A Ckll., Ann. Mag. Nat. His. (8), xiii, p. 504, 1914, ♂.
Hab. : Cheltenham, Port Phillip, V.

***Halictus helichrysi** Ckll., Ann. Mag. Nat. His. (8), xiii, p. 515, 1914, ♀
Hab. : Mount Tambourine, Brisbane, Bribie Island, Q.

Halictus holochlorus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 507, 1914, ♀.
Hab. : Cheltenham, V.

Halictus humei Ckll., The Entomologist, p. 303, 1905.
Hab. : Australia.

Halictus (Chloralictus) humilis Sm.
Halictus humilis Sm., New Sp. Hym. B.M., p. 36, 1879, ♀.
Halictus (*Chloralictus*) *humilis* Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 228, 1910, ♀.
Hab. : Champion Bay, W.A. ; Adelaide, S.A.

***Halictus idoneus** Ckll., Ann. Mag. Nat. His. (8), xiii, p. 517, 1914, ♂.
Hab. : Brisbane, Q.

Halictus imitans Ckll., Ann. Mag. Nat. His. (8), xiii, p 516, 1914.
Hab. : Victoria ; Tasmania.

Halictus inclinans Sm., New Sp. Hym. B.M., p. 36, 1879, ♀ ; Ckll., Ann. Mag. Nat. His. (8), ix, p. 386, 1912.
Hab. : Champion Bay, W.A. ; Windsor, V.

Halictus instabilis Ckll., Ann. Mag. Nat. His. (8), xiii, p. 510, 1914, ♀.
Hab. : Croydon, V.

Halictus isthmalis Ckll., Ann. Mag. Nat. His. (8), xiv, p. 367, 1914, ♂ ; Ann. Mag. Nat. His. (8), xvi, p. 97, 1915, ♀.
Hab. : Eaglehawk Neck, T.

Halictus kesteveni Ckll., Ann. Mag. Nat. His. (8), ix, p. 386, 1912, ♂.
Hab. : Kuranda, Cairns, Cape York, Q.

Halictus kurandensis Ckll., Ann. Mag. Nat. His. (8), xiii, p. 515, 1914.
Hab. : Cairns, Kuranda, Q.

Halictus lanariellus Ckll., Proc. Acad. Nat. Sc. Philad., p. 373, 1916, ♀.
Hab. : Yarrawin, N.S.W.

***Halictus lanarius** Sm., Cat. Hym. B.M., i, p. 57, 1853, ♀ ; Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 235, 1910, ♀ ♂.
Hab. : Devonport, T. ; Adelaide, S.A. ; Hunter River, N.S.W. ; Brisbane, Mount Tambourine, Q. ; Murwillumbah, N.S.W. ; Launceston, T.

***Halictus lanuginosus** Sm., New Sp. Hym. B.M., p. 34, 1879, ♀♂.
Hab. : Brisbane, Mount Tambourine, Q.

***Halictus leichardti** Ckll., The Entomologist, p. 59, 1906 ; Ckll., Ann. Mag. Nat. His. (8), x, p. 486, 1912.
Halictus paracolletinus Ckll., Trans. Amer. Ent. Soc. xxxvi, p. 201, 1910, ♀.
Halictus paracolletinus Ckll., Ann. Mag. Nat. His. (8), ix, p. 387, 1912, ♂.
Hab. : Mackay, Kuranda, Q.

Halictus limatus Sm., Cat. Hym. B.M., i, p. 59, 1853, ♀.
Hab. : Tasmania.

***Halictus littleri** Ckll., The Entomologist, p. 307, 1914, ♀.
Hab. : Launceston, T.

Halictus macrops Ckll., Proc. Acad. Nat. Sc. Philad., p. 373, 1916, ♂.
Hab. : Launceston, T.

Halictus maitlandi Ckll., Trans. Amer. Ent. Soc , xxxvi, p. 233, 1910, ♀.
Hab. : Cairns, Kuranda, Q.

Halictus mediopolitus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 518, 1914, ♀.
Hab. : Murray River, S A.

Halictus melanopterus Ckll., The Entomologist, p. 243, 1914, ♀.
Hab. : Yallingup, W A.

Halictus melanurus Ckll , Ann. Mag. Nat. His. (9), iii, p. 125, 1919, ♀.
Hab. : York, W.A.

Halictus mirandus Turn., Ann. Mag Nat. His. (8), xiv, p. 8, 1914, ♀.
Hab. : Yallingup, W.A.

Halictus mitchelli Ckll.. The Entomologist, p. 58, 1906.
Hab. : Tasmania.

Halictus mjobergi Friese., Arkiv. för. Zool. Band ii, p. 5, 1917, ♀.
Hab. : Mt. Tambourine, Q.

Halictus mundulus Ckll., Proc. Acad. Nat. Sc. Philad., p. 366, 1916, ♀.
Hab. : Kalamunda, W.A.

Halictus murrayi Ckll., The Entomologist, p. 272, 1905.
Hab. : Australia.

***Halictus musicus** Ckll., Ann. Mag. Nat. His. (8), xi, p. 540, 1913, ♀.
Hab. : Mount Tambourine, Q.

Halictus nigroscopaceus Friese., Arkiv. för Zool. Band ii, p. 4, 1917, ♂ ♀.

Halictus niveifrons Ckll., Ann. Mag. Nat. His. (8), xiii, p. 520, 1914, ♂.
Hab. : Tasmania.

Halictus oblitus Sm., New Sp. Hym. B.M., p. 35, 1879, ♀.
Hab. : Swan River, W.A.

Halictus opacicollis Ckll., Ann. Mag. Nat. His. (8), xiii, p. 519, 1914, ♀.
Hab. : Hobart, T. ; Victoria.

Halictus orbatus Sm., Cat. Hym. B.M., i, p. 58, 1853, ♀; Ckll., Ann. Mag. Nat. His. (8), xiii, p. 511, 1914.
Hab. : Tasmania ; Fern Tree Gully, V.

Halictus oxleyi Ckll., The Entomologist, p. 303, 1905.
Hab. : Australia.

Halictus oxoniellus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 369, 1914, ♀; Mem. Queensl. Mus., vi, p. 116, 1918.
Hab. : Bribie Island, Q.

Halictus pachycephalus Ckll., Proc. Acad. Nat. Sc. Philad., p. 369, 1916, ♂.
Hab. : Yarrawin, N.S.W.

Halictus pavonellus Ckll., Ann. Mag. Nat. His. (8), xvi, p. 5, 1915, ♀.
Hab. : Bribie Island, Q.

***Halictus peraustralis** Ckll., Ann. Mag. Nat. His. (7), xiv, p. 211, 1914, ♀.
Hab. : South Australia ; Brisbane, Stradbroke Island, Q.

Halictus plebeius Ckll., Ann. Mag. Nat. His. (8), xiii, p. 517, 1914, ♀.
Hab. : Murray River, S.A.

***Halictus pulvitectus** Ckll., Ann. Mag. Nat. His. (8), xvi, p. 98. 1915, ♂♀.
Hab. : Eaglehawk Neck, Launceston, T.

Halictus punctatus Sm., New Sp. Hym. B.M., i, p. 36, 1879, ♀; Ann. Mag. Nat. His. (8), ix, p. 384, 1912.
Hab. : Champion Bay, W.A. ; Rutherglen, Melbourne, V. ; Sydney, N.S.W.

Halictus punctatus var. exlautus Ckll., Ann. Mag. Nat. His. (7), xvi, p. 300, 1905, ♀.
Hab. : Australia.

Halictus (Chloralictus) purnongensis Ckll., Ann. Mag. Nat. His. (8), xi, p. 393, 1913, ♂.
Hab. : Purnong, S.A.

***Halictus repertulus** Ckll., Mem. Queensl. Mus., v, p. 203, 1916, ♂.
Hab. : Brisbane, Q.

Halictus repertus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 521, 1914, ♂.
Hab. : Melbourne, V.

Halictus repræsentans Sm., Cat. Hym. B.M., i, p. 60, 1853, ♀♂.
Hab. : Australia.

Halictus rowlandi Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 226, 1910, ♀.
Hab. : Cairns, Kuranda, Q.

Halictus rufipes Sm., Cat. Hym. B.M., i, p. 56, 1853, ♀.
Hab. : Melbourne, V.

***Halictus rufotinctus** Ckll., Ann. Mag. Nat. His. (8), xvi, p. 7, 1915, ♀.
Hab. : Brisbane, Q.

Halictus sanguinipes Ckll., Ann. Mag. Nat. His. (8), xiii, p. 513, 1914.
Hab. : Windsor, V.

Halictus saycei Ckll., Ann. Mag. Nat. His. (8), ix, p. 386, 1912.
Hab. : Mackay, Q.

Halictus seductus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 512, 1914, ♀.
Hab. : Windsor, V. ; Tasmania.

***Halictus semipolitus** Ckll., Mem. Queensl. Mus., v, p. 202, 1916, ♀; Mem. Queensl. Mus., vi, p. 116, 1918.
Hab. : Bribie Island, Brisbane, Q.

Halictus semipolitus expulsus Ckll., Proc. Acad. Nat. Sc., Philad. p. 372, 1916, ♀.
Hab. : Georgetown, T.

***Halictus speculellus** Ckll., Mem. Queensl. Mus., vi, p. 117, 1918, ♀.
Hab. : Brisbane, Q.

Halictus spenceri Ckll., Proc. Acad. Nat. Sc. Philad., p. 368, 1916, ♂.
Hab. : Yallingup, W.A.

Halictus sphecodoides Sm., Cat. Hym. B.M., i, p. 58, 1853, ♀.
Hab. : Australia.

Halictus sphecodopsis Ckll., Ann. Mag. Nat. His. (7), xvi, p. 300, 1905, ♂.
Hab. : Mackay, Q.

Halictus stirlingi Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 232, 1910, ♀.
Hab. : Mackay, Q.

***Halictus sturti** Ckll., The Entomologist, p. 59, 1906; Ann. Mag. Nat. His. (8), ix, p. 386, 1912, ♀.
Hab. : Mackay, Q.

***Halictus subinclinans** Ckll., Ann. Mag. Nat. His. (8), xvi, p. 8, 1915, ♀.
Hab. : Launceston, T.

Halictus supralucens Ckll., Proc. Acad. Nat. Sc. Philad., p. 371, 1916, ♀.
Hab. : Kalamunda, W.A.

Halictus tamburinei Friese., Arkiv. för. Zool. Band ii, p. 6, 1917, ♂ ♀.
Hab. : Mt. Tambourine, Q.

Halictus tasmaniæ (Ckll.)
Sphecodes tasmaniæ Ckll., Ann. Mag. Nat. His. (7), xvi, p. 299, 1905, ♂.
Halictus tasmaniæ Ckll., Trans. Amer. Ent. Soc. xxxvi, p. 231, 1910.
Halictus tasmaniæ Ckll., Ann. Mag. Nat. His. (9), i, p. 165, 1918.
Hab. : Hobart, St. Helens, T.

Halictus tatei Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 227, 1910, ♀.
Hab. : Mackay, Q.

Halictus tertius D.T.

Halictus rufipes Sm., Cat. Hym. B.M., i, p. 56, 1853, ♀ (*nec* Fabr., *nec* Schenck).

Halictus tertius D.T., Cat. Hym., x, p. 86, 1896 ; Ckll., Ann. Mag. Nat. His. (8), xiii, p. 508, 1914.

Hab. : Melbourne, V.

***Halictus (Chloralictus) urbanus** Sm.

Halictus urbanus Sm., New Sp. Hym. B.M., p. 35, 1879, ♀.

Halictus (*Chloralictus*) *urbanus* Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 227, 1910 ; Mem. Queensl. Mus., vi, p. 116, 1918.

Hab. : Champion Bay, W.A. ; Port Darwin, N.T. ; Sydney, N.S.W. ; Brisbane, Q.

Halictus (Chloralictus) urbanus baudinensis Ckll., Ann. Mag. Nat. His. (7), xvi, p. 307, 1905, ♀.

Hab. : Baudin Island, N. W. Australia.

***Halictus (Chloralictus) urbanus var. stradbrokensis** Ckll., Proc. Acad. Nat. Sc. Philad., p. 366, 1916, ♀.

Hab. : Stradbroke Island, Bribie Island, Q.

Halictus victoriellus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 517, 1914, ♀.

Hab. : Victoria.

***Halictus vitripennis** Sm., New Sp. Hym. B.M., p. 34, 1879, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 301, 1905, ♀; Ann. Mag. Nat. His. (8), xiii, p. 504, 1914, ♀, *var. A* ; Mem. Queensl. Mus., vi, p. 116, 1918.

Hab. : Champion Bay, W.A. ; Purnong, V. ; Mackay, Brisbane, Q.

Halictus vividus Sm., New Sp. Hym. B.M., p. 35, 1879, ♀ ♂.

Hab. : Swan River, W.A.

Halictus warburtoni Ckll., The Entomologist, p. 58, 1906.

Hab. : Tasmania.

Halictus waterhousei Ckll., Ann. Mag. Nat. His. (8), xvi, p. 4, 1915, ♀ ♂.

Hab. : Woodford, N.S.W.

Halictus willsi Ckll., The Entomologist, p. 59, 1906.

Hab. : Australia.

Halictus woodsi Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 229, 1910, ♂ ♀.

Hab. : Cooktown, Q. ; Port Darwin, N.T.

Genus MELLITIDIA Guér., Voy. Coq. Zool., ii, p. 269, 1830.

Mellitidia australis (Guér).

Andrena australis Guér., Voy. Coq. Zool., ii, p. 269, 1830.

Mellitidia australis Sm., Cat. Hym. B.M., i, p. 119, 1853.

Hab. : Australia.

Genus STENOTRITUS Sm., Cat. Hym. B.M., i, p. 119, 1853.

Stenotritus elegans Sm., Cat. Hym. B.M., i, p. 119, 1853, ♀.
Var. A Ckll., Ann. Mag. Nat. His. (8), xiii, p. 136, 1914.
Hab. : Sydney, N.S.W. ; Tennant's Creek, Cent. Australia.

***Stenotritus elegantior** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 91, 1920, ♀.
Hab. : Queensland.

Stenotritus smaragdinus Sm., Trans. Ent. Soc. Lond., p. 254, 1868, ♀; Brenchly, Cruise of the Curaçoa, p. ?, 1873, ♀ T. 45 F. 6.
Hab. : Champion Bay, W.A.

Subfamily SPHECODINÆ.

Genus PARASPHECODES Sm., MSS. Cat. Hym. B.M, i, p.39, 1853.

Parasphecodes adelaidæ Ckll., Ann. Mag. Nat. His. (7), xvi, p. 297, 1905, ♀.
Hab. : Adelaide, S.A.

Parasphecodes altichus Sm., Cat. Hym. B.M., i, p. 42, 1853, ♂.
Hab. : Tasmania.

Parasphecodes arciferus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 142, 1914, ♀.
Hab. : Mordialloc, V.

***Parasphecodes atronitens** Ckll,. The Entomologist, p. 242, 1914, ♀.
Hab. : Caloundra, Q.

Parasphecodes atrorufescens Ckll., Ann. Mag. Nat. His. (8), xiii, p. 145, 1914, ♀.
Hab. : Purnong, V.

***Parasphecodes aurantiacus** Ckll., Mem. Queensl. Mus., v, p. 200, 1916, ♀.
Hab. : Brisbane, Q.

Parasphecodes basilautus Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 242, 1910, ♀ ♂.
Hab. : Cairns, Kuranda, Q.

***Parasphecodes bribiensis** Ckll., Mem. Queensl. Mus., v, p. 201, 1916, ♀; Mem. Queensl. Mus., vi, p. 118, 1918.
Hab. : Bribie Island, Stradbroke Island, Q.

Parasphecodes bryotrichus Ckll., Ann. Mag. Nat. His. (8), ix, p. 225, 1912, ♀.
Hab. : Cheltenham, V.

***Parasphecodes bryotrichus sordidulus** Ckll., Ann. Mag. Nat. His. (8), xiv, p. 369, 1914.
Hab. : Brisbane, Q.

***Parasphecodes callomelittinus** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 237, 1910, ♀; Mem. Queensl. Mus., vii, pt. 3, p. 88, 1921.
Hab. : Melbourne, V. : Bribie Island, Q.

Parasphecodes cervicalis Ckll., Ann. Mag. Nat. His. (8), xvi, p. 96. 1915, ♀.
Hab. : Eaglehawk Neck, T.

***Parasphecodes cirriferus** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 241, 1910, ♀.
Hab. : Victoria.

Parasphecodes contaminatus Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 238, 1910, ♂.
Hab. : Cairns, Kuranda.

Parasphecodes dissimulator Ckll., Ann. Mag. Nat. His. (8), xiii, p. 145, 1914, ♀.
Hab. : Carrom, V.

Parasphecodes excultus Ckll., P.L.S. N.S.W., xxxvii, p. 596, 1912 ; Ann. Mag. Nat. His. (8), xii, p. 373, 1913, ♀.
Hab. : Magnet, Mount Wellington, T.

Parasphecodes frenchi Ckll., Ann. Mag. Nat. His., (7), xiv, p. 210, 1904.
Hab. : Melbourne, V.

Parasphecodes froggatti Ckll., Ann. Mag. Nat. His. (7), xvi, p. 296, 1905, ♂.
Hab. : Victoria ; Bathurst, V.

Parasphecodes fultoni Ckll., Ann. Mag. Nat. His. (8), xiii, p. 143, 1914, ♀.
Hab. : Croydon, V.

***Parasphecodes fumidicaudus** Ckll., Ann. Mag. Nat. His. (8), xiii, p. 144, 1914, ♀.
Hab. : Stradbroke Island, Brisbane, Bribie Island, Q.

Parasphecodes hilactus Sm., Cat. Hym. B.M., i, p. 39, 1853, ♂.
Hab. : Swan River, W.A.

Parasphecodes hiltacus Sm., Cat. Hym. B.M., i, p. 39, 1853, ♂.
Hab. : Australia.

Parasphecodes hybodinus Ckll., Ann. Mag. Nat. His. (8), ix, p. 227, 1912, ♂.
Hab. : Windsor, V.

Parasphecodes infrahirtus Ckll., Ann. Mag. Nat. His. (9), v, p. 118, 1920, ♀.
Hab. : Launceston, T.

***Parasphecodes insculptus** Ckll., Mem. Queensl. Mus., vi, p. 118, 1918, ♀.
Hab. : Mount Tambourine, Q.

Parasphecodes lacthius Sm., Cat. Hym. B.M., i, p. 40, 1853, ♀.
Hab. : Australia.

***Parasphecodes latissimus** Ckll., Ann. Mag. Nat. His. (8), xvi, p. 96, 1915, ♀.
Hab. : Bridport, T.

***Parasphecodes leptospermi** Ckll., Mem. Queensl. Mus., v, p. 202, 1916, ♀.
Hab. : Brisbane, Q.

Parasphecodes lichatus Sm., Cat. Hym. B.M., i, p. 40, 1853, ♀.
Hab. : Western Australia.

Parasphecodes lithusca Sm., Cat. Hym. B.M., i, p. 41, 1853, ♀.
Hab. : Tasmania.

Parasphecodes loweri Ckll., Ann. Mag. Nat. His. (7), xvi, p. 298, 1905, ♀.
Hab. : Adelaide, S.A.

Parasphecodes melbournensis Ckll., Ann. Mag. Nat. His. (7), xiv, p. 210, 1914.
Hab. : Melbourne, V.

Parasphecodes microdontus Ckll., Ann. Mag. Nat. His. (8), ix, p. 226, 1912, ♀.
Hab. : Melbourne, V.

Parasphecodes noachinus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 144, 1814, ♀.
Hab. : Ararat, V.

Parasphecodes perustus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 52, 1914, ♂.
Hab. : Mount Wellington, T.

Parasphecodes plorator Ckll., Ann. Mag. Nat. His. (8), vi, p. 274, 1910, ♀; Ann. Mag. Nat. His. (8), xiii, p. 143, 1914.
Hab. : Croydon, Melbourne, V. ; Mount Wellington, T.

Parasphecodes recantans Ckll., Ann. Mag. Nat. His. (8), ix, p. 227, 1912, ♂.
Hab. : Victoria.

Parasphecodes recessus Ckll., Ann. Mag. Nat. His. (8), xiv, p. 51, 1914, ♀.
Hab. : Mount Wellington, T.

Parasphecodes rhodopterus Ckll., The Entomologist, p. 306, 1914, ♀.
Hab. : Launceston, T.

***Parasphecodes rufotegularis** Ckll., The Entomologist, p. 306, 1914, ♂.
Hab. : Launceston, T.

Parasphecodes schomburgki Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 239, 1910, ♀.
Hab. : Adelaide, S.A.

Parasphecodes sextus Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 239, 1910, ♂.
Hab. : Adelaide, S.A.

***Parasphecodes speculiferus** Ckll., Ann. Mag. Nat. His. (8), ix, p. 228, 1912, ♀; Mem. Queensl. Mus., v, p. 201, 1916, ♀.
Var. A Ckll., Ann. Mag. Nat. His. (8), ix, p. 229, 1912, ♀.
Hab. : Victoria ; Sydney, N.S.W. ; Brisbane, Q.

Parasphecodes stuchila Sm., Cat. Hym. B.M., i, p. 42, 1853, ♀.
Hab. : Tasmania.

Parasphecodes sulthica Sm., Cat. Hym. B.M., i, p. 40, 1853, ♂.
Hab. : Australia.

Parasphecodes talchius Sm., Cat. Hym. B.M., i, p. 42, 1853, ♂; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 296, 1905, ♂.
Hab. : Tasmania.

Parasphecodes taluchis Sm., Cat. Hym. B.M., i, p. 43, 1853, ♀.
Hab. : Tasmania.

Parasphecodes tepperi Ckll., Ann. Mag. Nat. His. (7), xvi, p. 299, 1905, ♀.
Hab. : Adelaide, S.A.

Parasphecodes tilachiformis Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 234, 1907, ♀
Hab. : New South Wales.

Parasphecodes tilachus Sm., Cat. Hym. B.M., i, p. 41, 1853, ♀.
Hab. : Tasmania.

Parasphecodes tuchilas Sm., Cat. Hym. B.M., i, p. 41, 1853, ♀.
Hab. : Australia.

Parasphecodes turneri Ckll., Ann. Mag. Nat. His. (8), xiv, p. 50, 1914, ♀ ♂.
Hab. : Eaglehawk Neck, T.

Parasphecodes vau Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 242, 1910, ♀.
Hab. : N.W. Australia.

Parasphecodes vermiculatus Ckll., Ann. Mag. Nat. His. (8), xiii, p. 141, 1914, ♂.
Hab. : Victoria.

Parasphecodes vulneratus Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 240, 1910, ♂.
Hab. : Victoria,

Parasphecodes wellingtoni Ckll., Ann. Mag. Nat. His. (8), xiv, p. 49, 1914, ♀.
Hab. : Mount Wellington, T.

Genus SPHECODES Latr., His. Nat., xiii, p. 368, 1805.

***Sphecodes profugus** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 244, 1910, ♀ ♂.
Hab. : Mackay, Brisbane, Birkdale, Q.

Family NOMADIDÆ.

Genus NOMADA Scop., Annus His. Nat., iv, p. 44, 1770.

Nomada australensis Perk., Ann. Mag. Nat. His. (8), ix, p. 116, 1912, ♂ ♀.
Hab. : Cairns, Mackay, Q.

Family MELECTIDÆ.

Genus CROCISA Jurine, Nouv. méth. class. Hym., p. 239, 1807.

***Crocisa albomaculata** Sm., Trans. Ent. Soc. Lond., p. 258, 1868, ♀.
Hab. : Champion Bay, King George's Sound, W.A.

Crocisa albopicta Ckll., The Entomologist, p. 217, 1910.
Hab. : Mackay, Q.

Crocisa australensis Rad., Bull. Soc. Nat. Moscow, p. 177, 1893, ♀.
Hab. : Australia.

Crocisa beatissima Ckll., Entomological News, p. 46, 1907, ♀.
Hab. : Adelaide, S.A.

***Crocisa cæruleifrons** Kirby.
Var. A Ckll., Ann. Mag. Nat. His. (7), xvi, p. 219, 1905.
Var. B darwini Ckll., Ann. Mag. Nat. His. (7), xvi, p. 219, 1905.
Hab. : Port Darwin, N.T. ; Gordonvale, Dunk Island, Townsville, Stradbroke Island, Q.

Crocisa cæruleopunctata Bl., His. Nat. Insect., iii, p. 411, 1840.
Hab. : Australia.

***Crocisa lamprosoma** Boisd. Voy. de l'Astrolabe, p. 653, 1834.
Crocisa novahollandiæ Lep., His. Nat. Insect. Hym., ii, p. 450, 1841, ♂.
Crocisa lamprosoma Ckll., Ann. Mag. Nat. His. (7), xvi, p. 219, 1905 ; Ann. Mag. Nat. His. (8), xii, p. 372, 1913.
Hab. : Blue Mountains, N.S.W. ; Brisbane, Duaringa, Stradbroke Island, Q.

rocisa lugubris Sm., New Sp. Hym. B.M., p. 107, 1879, ♀.
Hab. : Australia.

***Crocisa macleayi** Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 232, 1907, ♀.
Hab. : New South Wales ; Brisbane, Buderim Mountain, Q.

Crocisa quadrimaculata Rads., Bull. Soc. Natural. Moscow, p. 171, 1893, ♀ ♂ ; Ckll., Jour. New York Ent. Soc. xviii, p. 100, 1910.
Hab. : Finke River, S.A.

Crocisa quartinæ Grib., Bull. Soc. Entom. Ital., xvi, p. 272, 1884, ♀ ♂.
Hab. : Mackay, Cooktown, Q.

Crocisa tincta Ckll., Ann. Mag. Nat. His. (7), xvi, p. 219, 1905, ♀.
Hab. : Toowoomba, Q.

***Crocisa waroonensis** Ckll., Proc. Linn. Soc. N.S.W., p. 594, 1912, ♂ ; Ann. Mag. Nat. His. (8), xii, p. 373, 1913.
Hab. : Waroona, Swan River, W.A.

Family ANTHOPHORIDÆ.

Genus ANTHOPHORA Latr., His. Nat. Cr. et Ins., xiv, p. 45, 1804.

(Including subgenus *Sarapoda* Latr., Gen. Crust. et Insect., iv, p. 177, 1809)

Anthophora adelaidæ Ckll., Ann Mag. Nat. His. (7), xvi, p. 397, 1905. ♂
Hab. : Adelaide River, N.T.

***Anthophora æruginosus** Sm., Cat. Hym. B.M., ii, p. 336, 1854, ♀ ♂; Dours., Monogr. icon. *Anthophora*, p. 82, 1869, ♀ ♂; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 295, 1905, ♀ ♂.

Hab. : Bribie Island, Duaringa, Townsville, Gordonvale, Q ; Port Darwin, N.T. ; Hunter River, N.S.W.

Anthophora (Saropoda) alpha Ckll.

Saropoda alpha Ckll., Ann. Mag. Nat. His. (7), xiv, p. 204, 1904.

Hab. : Toowoomba, Mackay, Q.

***Anthophora (Saropoda) bombiformis** Sm.

Saropoda bombiformis Sm., Cat. Hym. B.M., ii, p. 318, 1854, ♂ ♀.

Anthophora bombiformis Dours., Monogr. icon. *Anthophora*, p. 202, 1869, ♀ ♂.

Saropoda bombiformis Ckll., Ann. Mag. Nat. His. (7), xvi, p. 296, 1905.

Hab. : Richmond River. N.S.W. ; Toowoomba, Brisbane, Buderim Mtn., Q.

Anthophora chlorocyanea Ckll.

Anthophora cingulata Ckll., Ann. Mag. Nat. His. (7), xvi, p. 397, 1905, ♀.

Anthophora chlorocyanea Ckll., Ann. Mag. Nat. His. (8), xiv, p. 469, 1914.

Hab. : South Australia.

***Anthophora cingulata** (Fabr.).

Megilla cingulata Fabr., Syst. Piez., p. 332, No. 18, 1804.

Anthophora cincta Dours. (*nec* Fabr.), Mon. Icon. *Anthophora*, p. 58, 1869, ♀

Anthophora emendata Sm., New Sp. Hym. B.M., p. 123, 1879, ♂ (*nec* ♀).

Anthophora emendata Sm., var *gilberti* Ckll., Ann. Mag. Nat. His. (7), xvi, p. 396, 1905, ♀.

Anthophora cingulata M.-Waldo, Ann. Mag. Nat. His. (8), xiii, p. 58, 1914.

Hab. : Mackay, Brisbane, Blackall Range, Q.

Anthophora darwini Ckll., Ann. Mag. Nat. His. (8), v, p. 409, 1910, ♂.

Hab. : Port Darwin, N.T.

***Anthophora lilacina** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 84, 1921, ♂.

Hab. : Kuranda, Q.

***Anthophora pulchra** Sm., Cat. Hym. B.M., ii, p. 335, 1854, ♀.

Anthophora zonata var. *pulchra* Dours., Monogr. icon. *Anthophora*, p. 190, 1869, ♀.

Anthophora pulchra Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 83, 1921.

Hab. : Brisbane, Stradbroke Island, Tambourine Mountain, National Park, Q.

Anthophora preissi Ckll., Jour. New York, Ent. Soc., xviii, p. 107, 1910, ♀.

Hab. : West Australia.

Anthophora preissi froggatti Ckll., Ann. Mag. Nat. His. (8), xiv, p. 468, 1914, ♀.

Hab. : Brewarrina, N.S.W.

***Anthophora rhodoscymna** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 395, 1905, ♂; Ann. Mag. Nat. His. (8), xiv, p. 12, 1914, ♀.
Hab.: Mackay, Brisbane, Pialba, Q.

Anthophora salteri Ckll., Ann. Mag. Nat. His. (7), xvi, p. 398, 1905, ♂.
Hab.: Parramatta, N.S.W.

Anthophora scymna Grib., Bull. Soc. Entom. Ital., v, p. 79, 1873, ♀; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 395, 1905.
Hab.: Adelaide, S.A.; West Australia.

***Anthophora walkeri** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 396, 1905, ♀ ♂.
Hab.: Baudin Island, W.A.

Anthophora zonata L., Syst. Nat., p. 576, 1758; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 396, 1905; Ckll., Ann. Mag. Nat. His. (8), v, p. 412, 1910; Ckll., Ann. Mag. Nat. His. (8), vii, p. 491, 1911.
Hab.: Mackay, Q.

Anthophora zonata subcærulea Lep.
Anthophora subcærulea Lep., His. Nat. Insect. Hymén., ii, p. 30, 1841, ♂ ♀.
Anthophora zonata subcærulea Ckll., Ann. Mag. Nat. His. (7), xvi, p. 396, 1905, ♂.
Hab.: West Australia; Adelaide, S.A.; Mackay, Q.

Genus GASTROPSIS Sm., Trans. Ent. Soc. Lond. Proc., p. xxxix, 1868; Ckll., The Can. Entom., p. 304, 1904.

***Gastropsis pubescens** (Sm.).
Oestropsis pubescens Sm., Trans. Ent. Soc. Lond., p. 253, 1868, ♂.
Gastropsis pubescens Sm., Trans. Ent. Soc. Lond. Proc., p. xxxix, 1868.
Gastropsis pubescens Ckll., The Can. Entom., xxxvi, p. 304, 1904, ♂.
Hab.: Western Australia; Victoria: Brisbane. Q.

Gastropsis victoriæ Ckll., The Entomologist, xxix, p. 15, 1906.
Var. A Ckll., Ann. Mag. Nat. His. (8), ix, p. 381, 1912, ♂.
Hab.: West Australia.

***Gastropsis victoriæ rufocollaris** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 91, 1921, ♂.
Hab.: Mallee, V.

Division MEGACHILIFORMES.

Family MEGACHILIDÆ. Subfamily CŒLIOXYNÆ.

Genus CŒLIOXYS Latr., Gen. Crust. et Ins., iv, p. 166, 1809.

Cœlioxys albiceps Friese., Ann Mus. Hung. (7), p. 268, 1909; Ckll., Ann. Mag. Nat. His. (8), v, p. 501, 1910, ♂.
Hab.: Cairns, Q.

***Cœlioxys albolineata** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 222, 1905, ♀; Ann. Mag. Nat. His. (8), v, p. 501, 1910, ♂.
Hab.: Kuranda, Mackay, Brisbane, Q.

Cœlioxys froggatti Ckll., Proc. Linn. Soc. N. S. Wales, xxxvi, p. 170, 1911, ♀; M.-Waldo, Ann, Mag. Nat. His. (8), xiv, p. 458, 1914, ♂ ♀.
Hab.: Victoria; Eaglehawk Neck, T.; Yallingup, W.A.

***Cœlioxys reginæ** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 221, ♀; Ann. Mag. Nat. His. (8), v, p. 501, 1910, ♂.
Hab.: Brisbane, Stradbroke Island, Q.

Subfamily MEGACHILINÆ.

Genus ANDROGYNELLA Ckll., Ann. Mag. Nat. His. (8). vii, p. 313, 1911.

Androgynella detersa (Ckll.). Genotype.
Megachile detersa Ckll., Ann. Mag. Nat. His. (8). vi, p. 283, 1910, ♀.
Androgynella detersa Ckll., Ann. Mag. Nat. His. (8), vii, p. 313, 1911.
Hab.: Mackay, Kuranda, Q.

Genus LITHURGUS Latr., Fam. Nat. Regn. Anim., 1825; Gen. Crust. et Ins., ii, p. 350.

***Lithurgus atratiformis** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 295, 1905, ♀; Ann. Mag. Nat. His.(7), xvii, p. 529, 1906, ♂; Mem. Queensl. Mus., vi, p. 119, 1918.
Hab.: N. W. Australia; Brisbane, Stradbroke Island, Q.

Lithurgus dentipes Sm., Cat. Hym. B.M., i, p. 146, 1853, ♂.
Hab.: Australia.

Lithurgus rubricatus Sm., Cat. Hym. B.M., i. p. 146, 1853. ♀ ♂; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 295. 1905. ♀.
Lithurgus cognatus Sm., Trans. Ent. Soc. Lond., p. 255. 1868, ♀.
Hab.: Champion Bay, W.A.

Genus MEGACHILE Latr., His. Nat., iii, p. 382, 1802.

***Megachile abdominalis** Sm., Cat. Hym. B.M., i, p. 169, 1853, ♂; Rad., Bull. Soc. Nat. Moscow, xlvii, p. 143, 1874, ♀♂; Ckll., Ann. Mag. Nat. His. (7). xvii, p. 530, 1906.
Hab.: Townsville, Mackay, Brisbane. Q.

Megachile adelaidæ Ckll., Jour. New York Ent. Soc., xviii, p. 111, 1910, ♀.
Hab.: Adelaide, S.A.

Megachile albobasalis Sm., New Sp. Hym. B M., p. 65, 1879. ♀.
Hab.: Murray Island, Torres Strait.

Megachile annæ castaneipes Friese, Res de Exped a la Nouvelle Guinée Zool., v, p. 356, 1908.
Hab. : Queensland.

Megachile apicata Sm., Cat. Hym. B.M., i, p. 172, 1853, ♀; Ckll., The Entomologist, p. 167, 1913, ♂; Bull. Amer. Mus. Nat. His., xxiii, p. 224, 1907; Ann. Mag. Nat. His., xvii, p. 531, 1906 (reported as *modesta*, should be *apicata*).
Hab. : Yallingup, W.A. ; Adelaide, S.A. ; Mackay, Q.

Megachile atrella Ckll., Ann. Mag. Nat. His. (7), xvii, p. 532, 1906, ♀.
Hab. : Western Australia.

***Megachile aurifrons** Sm., Cat. Hym. B.M., i, p. 168, 1853, ♀; Ckll., Ann. Mag. Nat. His. (8), vi, p. 277, 1910, ♀.
Hab. : Perth, W.A. ; Brewarrina, N.S.W. ; Mackay, Winton, Q.

Megachile austeni Ckll., Ann. Mag. Nat. His. (7), xvii, p. 539, 1906, ♂; Ann. Mag. Nat. His. (8), vi, p. 282, 1910.
Hab. : Mackay, Cairns, Q.

Megachile australasiæ D.T.
Megachile imitata Sm., Trans. Ent. Soc. Lond., p. 257, 1868 (*nec* Smith 1853).
Megachile australasiæ D.T., Cat. Hym., p. 421, 1896.
Hab. : Champion Bay, W.A.

Megachile axillaris M.-Waldo., Ann. Mag. Nat. His. (8), xv, p. 328, 1915, ♀.
Hab. : Yallingup, W.A.

Megachile barvonensis Ckll., Ann. Mag. Nat. His. (8), xiv, p. 467, 1914, ♂.
Hab. : Yarrawin, N.S.W.

Megachile beutenmulleri Ckll., Amer. Mus. Nat. His., xxiii, p. 222, 1907, ♂.
Hab. : Victoria.

Megachile blackburnii Frgt., Trans. Roy. Soc. S.A., xvi, p. 72, 1893.
Hab. : Central Australia.

Megachile calida Sm., New Sp. Hym. B.M., p. 64, 1879, ♀ ♂.
Hab. : Queensland.

***Megachile canifrons** Sm., Cat. Hym. B.M., i, p. 171, 1853, ♂; Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 88, 1921, ♂.
Hab. : Western Australia ; Brisbane, Q.

Megachile captionis Ckll., Ann. Mag. Nat. His. (8), xiv, p. 466, 1914, ♂ ♀.
Hab. : Brewarrina, N.S.W. ; Woodend, V.

***Megachile cetera** Ckll., Ann. Mag. Nat. His. (8), ix, p. 220, 1912, ♀; Ann. Mag. Nat. His. (8), xi, p. 537, 1913; Mem. Queensl. Mus., v, p. 204, 1916.

Hab.: Nagambie, Gippsland, V.; Sydney, Cooma, N.S.W.; Brisbane, Bribie Island, Q.

***Megachile chrysopyga** Sm., Cat. Hym. B.M., i, p. 173, 1853, ♀ ♂.

Megachile maculariformis Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 223, 1907, ♀.

Megachile chrysopyga Ckll., Ann. Mag. Nat. His. (8), v, p. 29, 1910.

Hab.: Tasmania; N.S. Wales;' Geraldton, Perth, W.A.; Brisbane, Bribie Island, Stradbroke Island, Q.

***Megachile ciliatipes** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 89, 1921, ♂.

Hab.: Brisbane, Kuranda, Q.

Megachile cincturata Ckll., Ann. Mag. Nat. His. (8), ix, p. 222, 1912, ♀ ♂.

Hab.: Cape York, Q.

Megachile clypeata Sm., Cat. Hym. B.M., i, p. 170, 1853, ♀.

Hab.: Busselton, Yallingup, W.A.

Megachile cornifera Rad., Bull. Soc. Nat. Moscow, xlvii, p. 148, 1874; Ckll., The Entomologist, p. 164, 1913, ♂.

Hab.: Southern Cross, W.A.

Megachile cygnorum Ckll., Ann. Mag. Nat. His. (7), xvii, p. 536, 1906, ♂; Ann. Mag. Nat. His. (8), xiv, p. 466, 1914.

Hab.: Perth, W.A.; Adelaide, S.A.; Woodend, V.; N. S. Wales; Mackay, Q.

Megachile darwiniana Ckll., Ann. Mag. Nat. His. (7), xvii, p. 535, 1906.

Hab.: Port Darwin, N.T.

***Megachile derelicta** Ckll., The Entomologist, p. 166, 1913, ♀ ♂.

Hab.: Windsor, V.; Brisbane, Q.

Megachile doddiana Ckll., Ann. Mag. Nat. His. (7). xvii, p. 530. 1906, ♀.

Hab.: Townsville, Q.

Megachile doddiana var. clarkei Ckll., Ann. Mag. Nat. His. (8), xiv, p. 464, 1914, ♀.

Hab.: Geraldton, W.A.

Megachile erythropyga Sm., Cat. Hym. B.M., i, p. 167, 1853, ♀ ♂.

Hab.: Yallingup, Kalamunda, Perth, W.A.

Megachile eucalypti Ckll., Ann. Mag. Nat. His. (8), vi, p. 360, 1910, ♀ ♂.

Hab.: Mackay, Q.

Megachile fabricator Sm., Trans. Ent. Soc. Lond., p. 256, 1868, ♀ ♂.

Hab.: Champion Bay, Kalamunda, Perth, W.A.

***Megachile ferox** Sm., New Sp. Hym. B.M., p. 64, 1879, ♂; Ckll., Ann. Mag. Nat. His. (8), xi, p. 531, 1913, ♀; M.-Waldo, Ann. Mag. Nat. His. (8), xv, p. 332, 1915, ♀.
Hab.: Yallingup, W.A.; Ararat, V.; Brisbane, Q.

Megachile fultoni Ckll., Ann. Mag. Nat. His. (8), xi, p. 535, 1913, ♀ ♂.
Hab.: N. W. Australia; Purnong, V.

Megachile fulvomarginata Ckll., Ann. Mag. Nat. His. (7), xvii, p. 531, 1906, ♀.
Hab.: Mackay, Q.

Megachile fumipennis Sm., Trans. Ent. Soc. Lond., p. 257, 1868, ♀.
Hab.: Champion Bay, W.A.

Megachile fuscitarsis Ckll., Ann. Mag. Nat. His. (8), ix, p. 223, 1912, ♂.
Hab.: Queensland.

Megachile gahani Ckll., Ann. Mag. Nat. His. (7), xvii, p. 537, 1906, ♂.
Hab.: Australia.

Megachile gilbertiella Ckll. (*vel apicata*, subsp. ?) Ann. Mag. Nat. His. (8) vi, p. 362, 1910, ♀.
Hab.: Cooktown, Q.

Megachile glaberrima Friese, Deutsche ent Zeitschr., p. 217, 1911; Ckll., Ann. Mag. Nat. His. (8), ix, p. 221, 1912.
Hab.: Cairns, Mackay, Q.

***Megachile hackeri** Ckll., The Entomologist, xlvi, p. 166, 1913, ♂ ♀.
Hab.: Brisbane, Stradbroke Island, Q.

***Megachile hæmatogastra** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 90, 1921, ♀.
Hab.: Cairns, Q.

Megachile hampsoni Ckll., Ann. Mag. Nat. His. (7), xvii, p. 533, 1906, ♀.
Hab.: Freemantle, Yallingup, W.A.

***Megachile heliophila** Ckll., Ann. Mag. Nat. His. (8), xii, p. 103, 1913, ♂.
Hab.: Brisbane, Q.

Megachile henrici Ckll., The Entomologist, xl, p. 223, 1907, ♀; Ckll., Bull. Amer Mus. Nat. His., xxiii, p. 223, 1907, ♀.
Hab.: Sydney, N.S.W.; Adelaide, S.A.

***Megachile heriadiformis** Sm., Cat. Hym. B.M., i, p. 172, 1853, ♀.
Hab.: Adelaide, S.A.; Yallingup, W.A.

Megachile holura Ckll., Ann. Mag. Nat. His. (8), ix, p. 221, 1912, ♂
Hab.: Rutherglen, V.

Megachile horatii Ckll., The Entomologist, p. 165, 1913, ♂.
Hab. : Southern Cross, W.A.

Megachile ignita Sm., Cat. Hym. B.M., i, p. 169, 1853, ♂.
Hab. : Australia.

Megachile imitata Sm., Trans. Ent. Soc. Lond., p. 257, 1868, ♀.
Hab. : Champion Bay, W.A.

Megachile kirbyana Ckll., Ann. Mag. Nat. His. (7), xvii, p. 537, 1906, ♂.
Hab. : Freemantle, Yallingup, W.A.

Megachile kurandensis Ckll., Ann. Mag. Nat. His. (8), vi, p. 359, 1910, ♂.
Hab. : Cairns, Kuranda, Q.

***Megachile latericauda** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 88, 1921, ♀ ♂.
Hab. : Swan River, W.A.

Megachile latipes Sm., Cat. Hym. B.M., i, p. 169, 1853, ♂.
Hab. : Sydney, N.S.W. ; Adelaide, S.A.

Megachile leeuwinensis M.-Waldo., Ann. Mag. Nat. His. (8), xv, p. 330, 1915, ♀ ♂.
Hab. : Yallingup, W.A.

Megachile leucopyga Sm., Cat. Hym. B.M., i, p. 173, 1853, ♀.
Hab. : Tasmania.

Megachile lineatipes Ckll., Ann. Mag. Nat. His. (8), vi, p. 364, 1910, ♂.
Hab. : Kuranda, Q.

Megachile longiceps M.-Waldo., Ann. Mag. Nat. His. (8), xv, p. 332, 1915, ♀.
Hab. : Yallingup, W.A.

Megachile lucidiventris Sm., Cat. Hym. B.M., i, p. 168. 1853, ♀.
Hab. : Liverpool Plains, N.S.W.

***Megachile mackayensis** Ckll., Ann. Mag. Nat. His. (8), vi, p. 279, 1910, ♀ ♂ ; Mem. Queensl. Mus., vii, pt. 3, p. 88, 1921.
Hab. : N. S. Wales ; National Park, Mackay, Q.

Megachile macleayi Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 222, 1907, ♀.
Hab. : N. S. Wales.

***Megachile macularis** D.T.
Megachile maculata Sm., Cat. Hym. B.M., i, p. 170, 1853, ♀ (*nec* Smith, p. 160).
Megachile macularis D.T., Cat. Hym., x, p. 437, 1896.
Megachile macularis Ckll., Ann. Mag. Nat. His. (7), xvii, p. 533, 1906.
Hab. : Port Philip, V. ; Brisbane, Townsville, Cairns, Kuranda, Q.

Megachile micrerythrura Ckll., Ann. Mag. Nat. His. (8), vi, p. 281, 1910, ♂ ♀
Hab. : Port Darwin, N.T.

Megachile modesta Sm.

Megachile modestus Sm., Trans. Ent. Soc. Lond., ii, 3, p. 62, 1862-64, ♀♂.

Megachile modesta Ckll., Bull. Amer. Mus. Nat. His. xxiii, p. 224, 1907.

Hab. : Mackay, Q.

***Megachile monstrosa** Sm., Trans. Ent. Soc. Lond., p. 256, 1868 ; Brenchley's Cruise of Curaçoa, p. 463, pl. xlv, fig. 5, 1873, ♀; Ckll., Ann. Mag. Nat. His. (7), xvii, p. 531, 1906.

Hab. : Champion Bay, W.A. ; Townsville, Q.

***Megachile mundifica** Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 90, 1921, ♀.

Hab. : National Park, Q.

***Megachile mystacea** (Fabr.).

Apis mystacea Fabr., Syst. Entom., p. 385, 1775.

Megachile mystacea Sm., Cat. Hym. B.M., i, p. 166, 1853, ♀♂.

Megachile rufiventris Sm., Cat. Hym. B.M., i, p. 178, 1853, ♀♂.

Megachile mystacea Grib., Ann. Mus. Civ. Genova, xvi, p. 235, 1881.

Megachile mystacea Ckll., Ann. Mag. Nat. His. (7), xvii, p. 530, 1906.

Hab. : Port Essington, N.T. ; Townsville, Kuranda, Brisbane, Stradbroke Island, Q.

Megachile nasuta Sm., Trans. Ent. Soc. Lond., p. 258, 1868, ♀.

Hab. : Champion Bay, Yallingup, W.A.

Megachile nasuta argentifer Ckll., Jour. New York Ent. Soc., xviii, p. 110, 1910, ♀.

Hab. : Melbourne, V.

Megachile nigrovittata Ckll., Ann. Mag. Nat. His. (7), xvii, p. 535, 1906, ♂.

Hab. : N.W. Australia.

Megachile oblonga Sm., New Sp. Hym. B.M., p. 65, 1879, ♀.

Hab. : Western Australia.

Megachile obtusa Sm., Cat. Hym. B.M., i, p. 170, 1853, ♂.

Hab. : Yallingup, W.A.

Megachile oculipes Ckll., Ann. Mag. Nat. His. (8), vi, p. 363, 1910, ♂.

Hab. : Perth, W.A. ; Townsville, Q.

Megachile ordinaria Sm., Cat. Hym. B.M., i, p. 174, 1853, ♀.

Hab. : Tasmania.

Megachile pararhodura Ckll., Ann. Mag. Nat. His. (8), vi, p. 278, 1910.

Hab. : Mackay, Q.

Megachile phenacopyga Ckll., Jour. New York Ent. Soc., xviii, p. 109, 1910, ♂, The Entomologist, p. 165, 1913, ♀.

Hab. : Eastern Australia.

***Megachile pictiventris** Sm., Cat. Hym. B.M., i, p. 160, 1853, ♀; Sm., New Sp. Hym., p. 65, 1879, ♀.
Megachile senex Sm., Trans. Ent. Soc. Lond. (3), i, p. 61, 1862, ♀ (*nec* 1853 and 1864); Ckll., Ann. Mag. Nat. His. (7), xvii, p. 530, 1906.
Hab.: Clarence River, N.S.W.; Brisbane, Cairns, Kuranda, Q.

Megachile preissi Ckll., Jour. New York Ent. Soc., xviii, p. 110, 1910, ♀.
Hab.: Eastern Australia.

Megachile pretiosa Friese, Ann. Mus. Hung., vii, pp. 222-257, 1909.
Hab.: Cairns, Q.

Megachile punctata Sm., Cat. Hym. B.M., i, p. 168, 1853, ♂.
Hab.: Australia.

***Megachile quinquelineata** Ckll., Ann. Mag. Nat. His. (7), xvii, p. 534, 1906, ♀; Ann. Mag. Nat. His. (8), vi, p. 282, 1910.
Hab.: Kalamunda, W.A.; Melbourne, V.; Brisbane, Mackay, Kuranda, Cape York, Q.

Megachile ramulipes Ckll., Ann. Mag. Nat. His. (8), xi, p. 534, 1913, ♂.
Hab.: Kewell, V.

***Megachile recisa** Ckll., Ann. Mag. Nat. His. (8), xi, p. 534, 1913, ♂.
Hab.: Kewell, V.; Brisbane, Q.

Megachile relicta Ckll., Ann. Mag. Nat. His. (8), xi, p. 538, 1913, ♀.
Hab.: Tennant's Creek, S.A.

Megachile remeata Ckll., Ann. Mag. Nat. His. (8), xi, p. 538, 1913, ♀.
Hab.: Western Australia.

Megachile remotula Ckll., Jour. New York Ent. Soc., xviii, p. 111, 1910, ♀.
Hab.: Eastern Australia.

***Megachile resinifera** M.-Waldo., Ann. Mag. Nat. His. (8), xv, p. 329, 1915, ♀♂.
Hab.: Yallingup, W.A.

Megachile revicta Ckll., Ann. Mag. Nat. His. (8), xi, p. 539, 1913, ♀.
Hab.: Perth, W.A.

***Megachile rhodogastra** Ckll., Ann. Mag. Nat. His. (8), vi, p. 283, 1910, ♂.
Hab.: Mackay, Brisbane, Q.

***Megachile rhodura** Ckll., Ann. Mag. Nat. His. (7), xvii, p. 539, 1906, ♂; Ann. Mag. Nat. His (8), vi, p. 278, 1910, ♀.
Hab.: Mackay, Caloundra, Brisbane, Q.

Megachile rufolobata Ckll., Ann. Mag. Nat. His. (8), ii, p. 536, 1913, ♂.
Hab.: Perth, W.A.

Megachile rugosa Sm., New Sp. Hym. B.M., p. 65, 1879, ♂.
Hab. : Western Australia.

Megachile semicandens Ckll., Jour. New York Ent. Soc., xviii, p. 108, 1910, ♂.
Hab. : Adelaide, S.A.

*__Megachile semiluctuosa__ Sm., Cat. Hym. B.M., i, p. 172, 1853, ♀ ♂.
Hab. : Adelaide, S.A. ; Mallee, V.

*__Megachile sequior__ Ckll., Jour. New York Ent. Soc., xviii, p. 108, 1910, ♂; Ann. Mag. Nat. His. (8), vi, p. 278, 1910, ♀.
Hab. : Adelaide, S.A. ; Eidsvold, Q.

Megachile sericeicauda Ckll., Ann. Mag. Nat. His. (8), vi, p. 364, 1910, ♂.
Hab. : Mackay, Q.

*__Megachile serricauda__ Ckll., Ann Mag. Nat. His. (8), vi, p. 361, 1910, ♂.
Hab. : Perth, W.A. ; Brisbane, Mackay, National Park, Q.

Megachile sexmaculata Sm., Trans. Ent. Soc. Lond., p. 257, 1868, ♀.
Hab. : Perth, Yallingup, Champion Bay, W.A.

*__Megachile simplex__ Sm., Cat. Hym. B.M., i, p. 169, 1853, ♀; Ckll., Ann. Mag. Nat. His. (8), xi, p. 537, 1913, ♀.
Hab. : Ararat, V. : Brisbane, Q.

*__Megachile simpliciformis__ Ckll., Mem. Queensl. Mus., vi, p. 119, 1908, ♀.
Hab. : Stradbroke Island, Q.

Megachile speluncarum M.-Waldo., Ann. Mag. Nat. His. (8), xv, p. 329, 1915, ♀.
Hab. : Yallingup, W.A.

Megachile stalkeri Ckll., Ann. Mag. Nat. His. (8), vi, p. 282, 1910.
Hab. : Alexandria, North Australia.

*__Megachile subferox__ M.-Waldo., Ann. Mag. Nat. His. (8), xv, p. 333, 1915, ♀ ♂.
Hab. : Yallingup, W.A.

*__Megachile suffusipennis__ Ckll., Ann. Mag. Nat. His. (7), xvii, p. 531, 1906, ♀.
Hab. : Mackay, Brisbane, National Park, Bribie Island, Q.

*__Megachile tasmanica__ Ckll., Ann. Mag. Nat. His. (8), xvii, p. 277, 1916, ♂; Ckll., Mem. Queensl. Mus., vii, pt. 3, p. 88, 1921, ♂.
Hab. : George Town, T. ; Brisbane, Q.

Megachile tomentella Ckll., Ann. Mag. Nat. His. (7), xvii, p. 538, 1906, ♂.
Hab. : Swan River, W.A. ; Victoria.

*__Megachile trichognatha__ Ckll., Jour. New York Ent. Soc., xviii, p. 112, 1910, ♀; Ann. Mag. Nat. His. (8), vi, p. 278, 1910.
Hab. : Kalamunda, W.A. ; Adelaide, S.A. ; Victoria.

Megachile trichognatha tosticauda Ckll., Ann. Mag. Nat. His. (8), ix, p. 221, 1912, ♀.
Hab. : Mackay, Q.

***Megachile ustulata** Sm., Trans. Ent. Soc. Lond., ii, 3, p. 61, 1862-64, ♀.
Hab. : Kuranda, Brisbane, Pialba, Q.

Megachile ustulatiformis Ckll., Ann. Mag. Nat. His. (8), vi, p. 280, 1910, ♂.
Hab. : Kuranda, Q.

Megachile vestitor Ckll., Jour. New York Ent. Soc., xviii, p. 109, 1910, ♂ ; Ann. Mag. Nat. His. (8), xi, p. 538, 1913, ♂.
Hab. : Western Australia ; Eastern Australia.

Megachile victoriæ Ckll., The Entomologist, p. 167, 1913, ♂ ; Ann, Mag. Nat. His. (8), xi, p. 537, 1913, ♂.
Hab. : Victoria.

Megachile waterhousei Ckll., Ann. Mag. Nat. His. (7), xvii, p. 534, 1906, ♀.
Hab. : Mackay, Q.

Genus THAUMATOSOMA Sm., Trans. Ent. Soc. Lond, p. 394, 1864.

Thaumatosoma callurum Ckll., Ann. Mag. Nat. His. (8), xiv, p. 467, 1914, ♂ ♀.
Hab. : Yarrawin, W.A.

Thaumatosoma duboulayi Sm., Trans. Ent. Soc. Lond., ii, 3, p. 395, 1864, ♂ ; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 221, 1905 ; M.-Waldo, Ann. Mag. Nat.. His. (8) xv, p. 334, 1915, ♀.
Hab. : Yallingup, W.A. ; Port Darwin, N.T.

Thaumatosoma turneri M.-Waldo, Ann. Mag. Nat. His. (8), xii, p. 491, 1913, ♂.
Hab. : Kuranda, Mackay, Q. ; Port Darwin, N.T. ; Baudin Island, W.A.

Division XYLOCOPIFORMES.

Family XYLOCOPIDÆ.

Genus XYLOCOPA Latr., Nat. His. Ins., iii, p. 379, 1802.

Subgenus MESOTRICHIA Westw., Trans. Ent. Soc. Lond., ii, p. 112, 1838.

***Xylocopa (Mesotrichia) bryorum** (Fabr.).
Apis bryorum Fabr., Syst. Entom., p. 381, 1775.
Xylocopa bryorum Sm., Trans. Entom. Soc. Lond., p. 275, 1874, ♀ ♂.
Xylocopa aruana Rits., Tijdschr. v. Entom., xix, p. 178, 1876.
Xylocopa bryorum W. F. Kirby, Ann. Mag. Nat. His. (5), xiii, p. 412, 1884.
Xylocopa bryorum subsp. *dimidiata* Ckll., Ann. Mag. Nat. His. (7), xvi, p.224, 1905.
Xylocopa bryorum Ckll., Bull. Amer. Mus. Nat. His., xxiii, p. 228, 1907.
Hab.: N. S. Wales ; Brisbane, Stradbroke Island, Dalby, Dunk Island, Cairns, Gordonvale, Cape York, Q.

Genus LESTIS Lep., Encycl. Méthod. Insect., x, p. 795, 1825.

***Lestis aerata** Sm.

Lestis aeratus Sm., Trans. Ent. Soc. Lond. (2), i, p. 180, 1851, ♀♂.
Lestis aerata Ckll., Ann. Mag. Nat. His. (7), xvi, p. 224, 1905.

Hab. : Hunter River, Sydney, N.S.W. ; Mallee, V.

***Lestis bombylans** (Fabr.).

Apis bombylans Fabr., Ent. Syst., ii, p. 338, 1775.
Centris bombylans Fabr., Syst. Piez., p. 358, 1804.
Lestis bombylans Lep., Encycl. Méthod. Insect., x, p. 795, 1825.
Lestis bombylans Sm., Trans. Ent. Soc. Lond., (2) i, p. 180, 1851, ♀♂.

Hab. : Brisbane, Bribie Island, Stradbroke Island, Caloundra, Q.

Family CERATINIDÆ.

Genus ALLODAPE Lep., Encycl. Méthod. Insect., x, p. 18, 1825.

***Allodape bribiensis** Ckll., The Entomologist, p. 200, 1914, ♀ ; Mem. Queensl. Mus. v, p. 204, 1916.

Hab. : Bribie Island, Q.

***Allodape diminuta** Ckll., Ann. Mag. Nat. His. (8), xv, p. 266, 1915, ♂♀.
Hab. : Yarrawin, N.S.W. ; Brisbane, Stradbroke Island, Q.

Allodape picta Sm., Cat. Hym. B.M., ii, p. 231, 1854, ♂.
Hab. : Australia.

***Allodape simillima** Sm., Cat. Hym. B.M., ii, p. 229, 1854, ♀ ; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 294, 1905 ; Ann. Mag. Nat. His (8), ix, p. 383, 1912, ♂.

Hab. : Western Australia ; Brisbane, Stradbroke Island, Mackay, Townsville. Q.

Allodape unicolor Sm., Cat. Hym. B.M., ii, p. 230, 1854, ♀ ; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 295, 1905.

Hab. : N. W. Australia ; Baudin Island, Queensland.

Genus EXONEURA Sm., Cat. Hym. B.M., ii, p. 232, 1854.

***Exoneura angophoræ** Ckll., Ann. Mag. Nat. His. (8), ix, p. 224, 1912, ♀.
Hab. : Sydney, N.S.W. ; Brisbane, Q.

***Exoneura angophoræ var obliterata** Ckll., Proc. Acad. Nat. Sc. Philad., p. 29, 1913, ♀.
Hab. : Brisbane, Q.

***Exoneura angophoræ occidentalis** Ckll., The Entomologist, p. 200, 1914, ♀.
Hab. : Yallingup, W.A.

***Exoneura aterrima** Ckll.

Exoneura botanica var. *aterrima* Ckll., Mem. Queensl. Mus., v, p. 204, 1916, ♀.
Exoneura aterrima Ckll., Mem. Queensl. Mus., vi, p. 119, 1918.
Hab. : Brisbane, Caloundra, Q.

***Exoneura bicolor** Sm., Cat. Hym. B.M., ii, p. 232, 1854, ♀ ; Ckll., Ann. Mag. Nat. His. (7), xvi, p. 465, 1905 ; Ann. Mag. Nat. His. (8), vi, p. 357, 1910, ♂.
Hab. : Franklin, Hobart, T. ; Melbourne, V. ; Ebor, N.S.W.

Exoneura botanica Ckll., Ann. Mag. Nat. His. (7), xvi, p. 465, 1905, ♀.
Hab. : Botany, N.S.W.

***Exoneura brisbanensis** Ckll., Mem. Queensl. Mus. v, p. 204, 1916, ♀.
Hab. : Brisbane, Caloundra, Q.

Exoneura clarissima Ckll., Ann. Mag., Nat. His. (8), xv, p. 267, 1915, ♂.
Hab. : Yarrawin, N.S.W.

Exoneura concinnula Ckll., Proc. Acad. Nat. Sc. Philad., p. 31, 1913, ♀.
Hab. : N. S. Wales.

Exoneura froggattii Friese, Ent. Nachr., xxv, p. 210, 1899 ; Ckll., Proc. Acad. Nat. Sc. Philad., p. 31, 1913, ♀ : Ann. Mag. Nat. His. (7), xvi, p. 465, 1905.
Hab. : Thornleigh, N.S.W.

Exoneura fultoni Ckll., Proc. Acad. Nat. Sc. Philad., p. 31, 1913, ♀.
Hab. : Victoria.

***Exoneura gracilis** Ckll., Mem. Queensl. Mus. vi, p. 119, 1918, ♀.
Hab. : Brisbane, Q.

***Exoneura hackeri** Ckll.

Exoneura angophoræ var. *hackeri* Ckll., Proc. Acad. Nat. Sc. Philad., p. 29, 1913, ♀.
Exoneura hackeri Ckll., Mem. Queensl. Mus., vi, p. 120, 1918.
Hab. : Brisbane, Caloundra, Q.

***Exoneura hackeri var incerta** Ckll., Mem. Queensl. Mus. vi, p. 120, 1918, ♀.
Hab. : Brisbane, Q.

***Exoneura hamulata** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 466, 1905, ♀ ; Proc. Acad. Nat. Sc. Philad, p. 30, 1913, ♂.
Var. A, The Entomologist, p. 308, 1914, ♀, Mem. Queensl. Mus., vi, p. 120, 1918, ♀.
Hab. : Moss Bay, N.S.W. ; Stradbroke Island, Brisbane, Caloundra, Q.

***Exoneura insularis** Ckll., The Entomologist, p. 200, 1914, ♀.
Hab. : Stradbroke Island, Q.

***Exoneura melæna** Ckll., Mem. Queensl. Mus., vi, p. 119, 1918, ♀.
Hab. : Caloundra, Q.

***Exoneura ploratula** Ckll., Ann. Mag. Nat. His. (8), ix, p. 224, 1912, ♀ ; Mem. Queensl Mus., vi, p. 119, 1918.
Hab. : Sydney, N.S.W. ; Brisbane, Q.

***Exoneura tau** Ckll., Ann. Mag. Nat. His. (7), xvi, p. 466, 1905 ; Mem. Queensl Mus., v, p. 204, 1916, ♀.
Hab. : Moss Bay, N.S.W. ; Brisbane, Q.

Exoneura turneri Ckll., The Entomologist, p. 199, 1914, ♀.
Hab. : Eaglehawk Neck, T.

Genus NEOCERATINA, Perk. Ann. Mag. Nat. His. (8), ix, p. 117, 1912.

Neoceratina australensis Perk., Ann. Mag. Nat. His. (8), ix, p. 117, 1912, ♀.
Hab. : Bundaberg, Q.

Division APIFORMES. (Social Bees.)

Family APIDÆ. Subfamily MELIPONINÆ.

Genus TRIGONA Jurine, Nouv. Méth. Class. Hymén., p. 245, 1807.

Trigona angophoræ Ckll., Ann. Mag. Nat. His. (8), ix, p. 225, 1912.
Hab. : Sydney, N.S.W.

Trigona australis Friese, Termes Fuzetek, xxi, p. 430, 1898.
Hab. : Queensland.

Trigona canifrons Sm., Journ. of Proc. Linn. Soc. Zool., ii, p. 51, 1857 ; Ckll., Ann Mag. Nat. His. (7), xvi, p. 220, 1905.
Hab. : Adelaide River, N.T.

***Trigona carbonaria** Sm., Cat. Hym. B.M., ii, p. 414, 1854.
Hab. : Australia (widely distributed).

***Trigona cassiæ** Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 247, 1910 ; Ann. Mag. Nat His. (8), ix, p. 139, 1912.
Hab. : Mackay, Caloundra, Brisbane, Q.

Trigona cincta Friese, Termes Fuzetek, xxi, p. 430, 1898 ; Ckll., Trans. Amer. Ent. Soc., xxxvi, p. 247, 1910.
Hab. : Hermannsberg, Finke River, Central Australia.

Trigona essingtoni Ckll., Ann. Mag. Nat. His. (7), xvi, p. 220, 1905.
Hab. : Port Essington, N.T.

Trigona mellipes Friese, Termes Fuzetek, xxi, p. 429, 1898.
Hab. : South Australia.

Subfamily APINÆ.

Genus APIS Linn., Syst. Nat. (Ed. 1*a*, 1735), Ed. 10*a*, i, p. 343, 1758.

Type : ***Apis mellifera** Linn. 1758 (=*mellifica*, L. 1767, Lmk. 1801, Jrn. 1801, Ltr. 1802–10).

Hab. : All parts of Australia. (Introduced.)

The species listed may be tabulated as follows :—

Family.	Genus.	Species.
Colletidæ	8	133
Prosopididæ	18	299
Andrenidæ	8	246
Nomadidæ	1	1
Melectidæ	1	13
Anthophoridæ	2	20
Megachilidæ	5	122
Xylocopidæ	2	3
Ceratinidæ	3	26
Apidæ	2	9
Total	50	872

NOTES AND ILLUSTRATIONS OF QUEENSLAND FISHES, No. 2.

BY ALLAN R. MCCULLOCH, ZOOLOGIST, AUSTRALIAN MUSEUM.
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(Plates VIII—XI.)

THE specimens dealt with in the following pages were secured by Captain Hoult during the trawling operations of the Queensland State trawler "Bar-ea-mul." This vessel worked along the entire coast between the southern boundary of the State and Cairns, principally in the ship channels inside the Barrier Reef, but occasionally in the passages through the reef to its outer edge. Captain Hoult found the area between Rockhampton and the Whitsunday Passage to be swarming with small fish of many kinds, but too small to be of commercial value. Even the Cato Bank in the Coral Sea, eastward of Rockhampton, was investigated, but, though the trawl was hauled successfully over the rough coral ground, fish were not secured in payable quantities, and the investigations were brought to an end early in 1921. Line fishing, on the other hand, produced an abundance of large edible fishes, and the ship was sometimes stocked up with supplies so obtained.

FAMILY SYNODONTIDÆ.

GENUS SYNODUS (Gronow) Bloch & Schneider.

The status and affinities of the new species here described may be expressed in the following key:—

a. Scales larger, l. lat. 43-52.
  b. Anal fin about as long as the dorsal, with 10-12 rays . . *intermedius*, *evermanni*, *poeyi*, and *dominicensis*.
  bb. Anal fin longer than the dorsal, with 15 rays . . . . *sageneus*.
aa. Scales smaller, l. lat. 58-68.
  c. Anal fin with 8-10 rays.
    d. Mouth extending little beyond the eye . . . . *simulans*.
    dd. Mouth extending well beyond the eye.
      e. 4½-5 scales between the lateral line and the dorsal fin.
        f. L. lat. 58-61.
          g. Indian and Pacific Ocean species.
            h. Eye little wider than interorbital space, and scarcely more than half as long as the snout; body markings indefinite, fins plain . . . . *houlti*.
            hh. Eye much wider than interorbital space, and more than half as long as the snout; body with distinct dark cross-bars, and fins with brown spots . . *japonicus*.

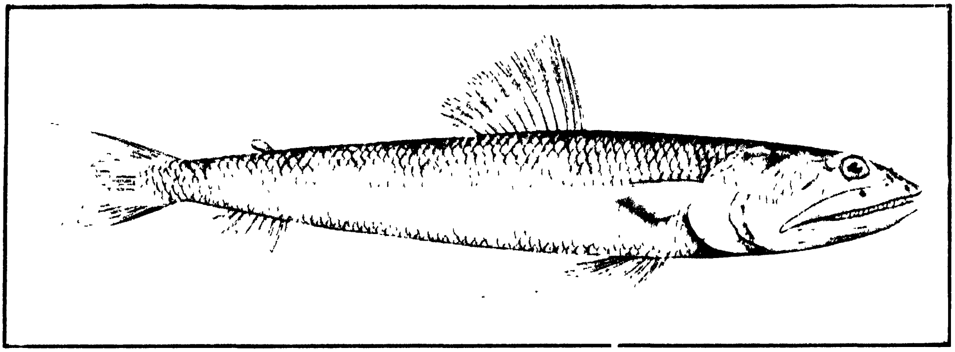

Fig. 1.—SYNODUS HOULTI sp. nov. Holotype, 203 mm. long.

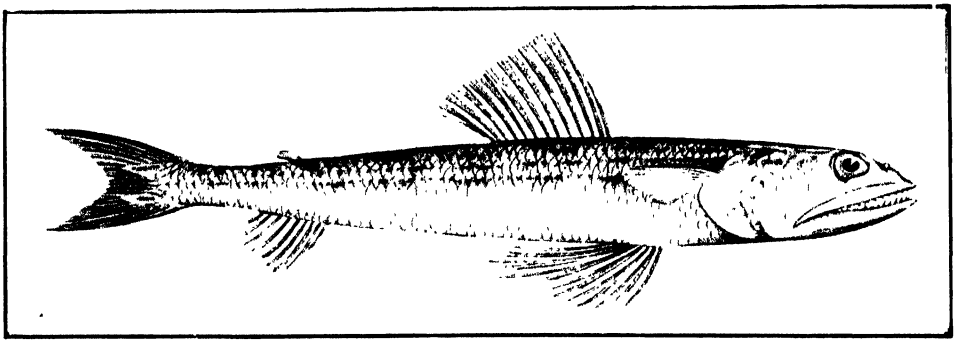

Fig. 2.—SYNODUS SIMILIS sp. nov. Holotype, 185 mm. long.

A. R. McCulloch, del.

gg. Atlantic Ocean species .. .. *synodus and atlanticus.*

ff. L. lat. 68.

i. 10 anal rays; light-coloured with dark cross-bars .. .. .. *dermatogenys.*

ii. 8 anal rays; black with dark cross-bars .. .. *lacertinus.*

ee. 3½ scales between lateral line and dorsal fin.

j. 11 dorsal and 10 anal rays: snout slightly longer than broad; eye about 4½ in the head .. .. *kaianus.*

jj. 13 dorsal and 8-9 anal rays.

k. Snout as broad as long; dorsal and caudal fins spotted, gill-membranes plain .. .. *indicus.*

kk. Snout broader than long; dorsal and caudal fins plain, upper part of gill-membranes with black blotches .. .. *similis.*

cc. Anal fin with 11 or more rays .. *acutus, altipinnis, saurus, scituliceps, jenkinsi, fœtens,* and *lucioceps.*

The characters of *S. erythræus* Klunginger, from the Red Sea, are unknown to me.

SYNODUS JAPONICUS Houttuyn.

Cobitis japonica Houttuyn, Verh. Holl. Mat. Harlem., xx, 1782, p. 450.
Salmo variegatus Lacepède, Hist. Nat. Poiss., v, 1803, p. 157.
Saurus varius Günther, Brit. Mus. Cat. Fish., v, 1864, p. 395 part.
Synodus japonicus Jordan & Herre, Proc. U.S. Nat. Mus., xxxii, 1907, p. 517—synonymy.

A single specimen 131 mm. long, from Murray Island, Torres Strait, enables me to add this species to the Australian list. Nine others from Lord Howe Island and one from Amboyna agree in having the postoral portion of the cheek naked as in *S. dermatogenys* Fowler, but have eight or nine anal rays instead of ten as in that species. The two species are evidently very similar.

SYNODUS HOULTI sp. nov.

(Plate VIII, fig. 1.)

Br. 15; D. 12; A. 9; P. 13; V. 8; C. 19; L. lat. 59; L. tr. 4½/7. Depth of the body before the ventrals less than its breadth, and 6·5 in the length to the hypural joint; head 3·3 in the same. Eye 1·8 in the snout, and 8·1 in the head; interorbital width 1·1 in the eye. Third dorsal ray 2·4, and pectoral fin 3 in the head.

Body subcylindrical, a little broader than deep, tapering backwards. Snout pointed, its width at the base distinctly greater than its length; jaws subequal. Nostrils close together, nearer the eye than the end of the snout; the opening of each is quite small, and the first has a posterior cutaneous lobule. Eye with very narrow adipose membranes anteriorly and posteriorly. Interorbital space concave. Cranium with some radiating ridges behind the eye and across the occiput. Mouth oblique, the premaxilla extending about two eye-diameters beyond the eye. Preopercular margin rounded, with a membranous border bearing mucigerous canals. Operculum unarmed, with a membranous border.

A single row of fixed, spaced, and compressed teeth along the outer edge of each premaxillary bone is covered by the lips; directly inside this row is another of longer, more numerous, and depressible teeth which are exposed when the mouth is closed. Mandibular teeth similar, in three rows, the outer row smallest and fixed, the other two depressible and the innermost largest. The symphyses of both jaws are toothless, but there are one or two larger teeth on each side of that of the mandible. A long band of depressible teeth on each palatine bone, arranged in four rows; the innermost teeth are largest, and they increase in size forwards, and are enlarged anteriorly. Tongue covered with large depressible teeth anteriorly, and a band of smaller ones posteriorly.

Body covered with cycloid scales, which have broad membranaceous borders. There are about sixteen rows between the occiput and the dorsal fin. Lateral line straight from the shoulder to the caudal peduncle; its scales are not raised, and are scarcely differentiated from the others. Five or six rows of scales on the cheeks, and a few on the upper portion of the operculum. Some rather elongate scales are present both above and below the base of the pectoral and above that of the ventral; an enlarged pinnate scale on the base of each caudal lobe.

Origin of dorsal fin slightly nearer the adipose dorsal than the tip of the snout: the third and longest ray just reaches the base of the last when adpressed; the two anterior rays are simple, and the last is double. Adipose dorsal finlet inserted above the middle of the anal. All the anal rays are simple, and the last is double. Pectoral fin short, not nearly reaching the vertical of the first dorsal ray. Ventrals inserted about midway between the verticals of the pectoral and dorsal origins; the inner and outer rays are simple and the others are bifid; the sixth ray is longest, and reaches about half its distance from the anal origin, and to the vertical of the last dorsal ray. Caudal forked.

Colour-markings.—Greyish on the back, the sides and lower surfaces white. Some very ill-defined cross-bars on the back, the most prominent of which is at the base of the tail, and some darker markings above the lateral line. Upper surface of the head with vermiculating grey lines which extend onto the lips near the end of the snout. Fins without markings.

Described and figured from the holotype, 203 mm. long from the snout to the end of the middle caudal rays.

Locality.—Near the Capricorn Group, Queensland, 25-30 fathoms.

This species differs from *S. similis* in having a much smaller eye, 4½ instead of 3½ supralateral scales, and small instead of large nostrils. It also lacks the dark marking on the upper portion of the gill-membranes. It is nearer *S. japonicus* Houttuyn, but has a much smaller eye and less rugose cranium, and the characteristic dark body markings and spots on the fins of that species are wanting in *S. houlti*.

SYNODUS SIMILIS sp. nov.

(Plate VIII, fig. 2.)

Br. 15; D. 13; A. 9; P. 13; V. 8; C. 19; L. lat. 58; L. tr. 3½/6. Depth of the body before the ventrals slightly less than its breadth, and about one-seventh of the length to the hypural joint; head 3·5 in the same. Eye 1·2 in the snout, and 5·1 in the head; interorbital width 1·3 in the eye. Third dorsal ray 1·8, third anal ray 3·1, and pectoral fin 2·1 in the head.

Body subcylindrical, a little broader than deep. Snout pointed, its width at the base distinctly greater than its length; jaws subequal. Nostrils close together, nearer the eye than the end of the snout; each has a rather large opening, and the first has a cutaneous lobe posteriorly. Eye with narrow adipose membranes anteriorly and posteriorly. Interorbital space a little concave. Cranium with some radiating ridges behind the eye and across the occiput. Mouth oblique, premaxilla extending about two-thirds of an eye-diameter beyond the eye. Preopercular margin rounded, without a free edge, with numerous muciferous canals extending from it onto the operculum; operculum unarmed, with a broad membranaceous border.

A single row of fixed, spaced, and compressed teeth along the outer edge of each premaxillary bone is covered by the lips; directly inside this row is another of more numerous, longer, and depressible teeth which are exposed when the mouth is closed. Mandibular teeth similar, in three rows, the outer row smallest and fixed, the other two depressible and the innermost largest. The symphyses of both jaws are toothless, but there are a few enlarged teeth on each side of that of the mandible. A long band of depressible teeth on each palatine arranged in four rows; the innermost teeth are largest and they increase in size forwards and are enlarged anteriorly. Lingual teeth depressible in about five rows anteriorly, the outermost of which are largest; these are followed by a band of small teeth.

Body covered with cycloid scales which have broad membranaceous borders. There are about fifteen between the occiput and the dorsal fin. Lateral line straight from the shoulder to the caudal peduncle; its scales are not keeled, and scarcely differentiated from the others. About five transverse rows of cycloid scales on the cheek, and two on the upper portion of the operculum. A few rather elongate scales both above and below the base of the pectoral fin, and above that of the ventral; an enlarged pennate scale on the base of each caudal lobe.

Origin of the dorsal fin almost midway between the end of the snout and the adipose dorsal; the third and longest ray reaches a little beyond the base of the last when adpressed. The two anterior dorsal rays are simple, and the last is double. Adipose dorsal inserted above the middle of the anal fin. The latter is short and composed of simple rays; the last is double. Pectoral fin short, not quite reaching the vertical of the first dorsal ray. Ventrals inserted between the verticals of the pectoral and dorsal origins; the inner and outer rays are simple, and the others are bifid; the sixth ray is longest and reaches almost half its distance from the base of the last anal ray, and well beyond that of the dorsal. Caudal forked.

Colour-marking.—Greyish on the back, the sides and lower surface white. Ill-defined grey markings form indefinite cross-bars and about eight imperfect rings on the lateral line. Grey lines form narrow interrupted rows along each series of scales on the upper half. Head with grey spots on the opercles, and the gill-membranes are ornamented with two large black spots on each side above the operculum. Fins without markings.

Described and figured from the holotype, 185 mm. long from the snout to the end of the middle caudal rays.

This species is apparently very similar to *S. indicus* Day, but its vertical fins are without markings, and the gill-membranes are ornamented with a black blotch which is not present in the Indian species. According to Day's description the ventral fins of *S. indicus* are shorter than in *S. similis*, the snout is as long as broad instead of broader than long, and the adipose membranes around the eye of *S. similis* are said to be wanting in *S. indicus*. *S. similis* differs from *S. kaianus* Günther in the number of dorsal and anal fin-rays, and in the proportions of the snout.

Locality.—Near the Capricorn Group, Queensland, 25-30 fathoms.

FAMILY APOGONIDÆ.

APOGON BREVICAUDATUS Weber.

Apogon brevicaudatus Weber, Notes Leyden Museum, xxxi, 2, 1909, p. 158, and Siboga Rept., Fische, lvii, 1913, p 232. pl. viii, fig. 3.

Amia berthæ Ogilby, Ann. Qld. Mus. x, 1911, p. 47, pl. v, fig. 1, and Mem. Qld Mus. i, 1912, p. 50.

A fine example 112 mm. long, agrees in all details with Weber's figure of this species, its markings being even better defined than in his illustration. A comparison of it with a smaller example of *A. berthæ*, which was received by the Australian Museum from Mr. J. D. Ogilby, proves the two to be synonymous; the vertical bands shown in Ogilby's figure disappear with age.

Localities.—Capricorn Group, 25-30 fathoms; coll. Queensland State trawler.

Wide Bay, Queensland; Australian Museum, exch. J. D. Ogilby.

FAMILY POMACENTRIDÆ.

The following key to the genera of this family is submitted as tentative only. It is largely a compilation derived from various smaller keys published by Günther, Jordan and Evermann, and others.

- *a.* Teeth fixed, extending along greater portion of free edge of each jaw.
  - *b.* Teeth conical or villiform, not compressed.
    - *c.* Preorbital with a strong spine directed backwards.. .. .. .. PREMNAS.
    - *cc.* Preorbital without a strong spine.

d. At least some of the opercles serrated.

e. All the opercles serrated .. .. AMPHIPRION.

ee. Only the preoperculum and sometimes the preorbital serrated.

f. 12-13 dorsal spines.

g. Less than 30 transverse series of scales .. .. DASCYLLUS.

gg. More than 30 transverse series of scales .. .. LEPIDOZYGUS.

ff 17 dorsal spines .. .. ACANTHOCHROMIS.

dd. None of the opercles serrated.

h. Lateral line not developed on the tail .. .. CHROMIS.

hh. Lateral line almost complete .. .. AZURINA.

bb. Teeth more or less compressed.

i. Lips greatly thickened, fimbriate, and curled back over the snout . CHEILOPRION.

ii. Lips normal.

j. Preoperculum serrated.

k. Spinous portions of dorsal and anal scaly like the soft portions; suboperculum and interoperculum entire .. .. POMACENTRUS.

1. Teeth biserial, truncate; soft dorsal short, often elevated; caudal deeply forked .. .. Subg. POMACENTRUS.

2. Teeth rounded; preorbital notched; caudal lunate Subg. PSEUDOPOMACENTRUS.

3. Teeth uniserial; snout and lower jaw scaly; spinous dorsal with membrane incised and lobed .. .. Subg. PARAPOMACENTRUS.

4. Snout and lower jaw naked .. .. Subg. AMBLYPOMACENTRUS.

5. Snout scaly, lower jaw naked; teeth uniserial; membrane of spinous dorsal not notched .. .. Subg. EUPOMACENTRUS.

6. As above, but membrane of spinous dorsal deeply notched .. .. .. Subg. BRACHYPOMACENTRUS.

kk. Spinous portions of dorsal and anal naked; suboperculum and interoperculum serrated .. .. DAYA.

jj. Preoperculum smooth

l. 30 or less transverse series of scales.

m. Suborbitals adnate to the cheeks.

n. Suborbitals completely covered by scales .. .. NEXILARIUS

nn. Suborbital scales not well formed .. . . NEXILOSUS.

mm. Suborbitals not adnate to the cheeks.

o. Teeth emarginate, in a single row .. ..GLYPHISODON.

1. Preorbital very narrow, snout rather acute; 12 anal rays .. .. Subg. GLYPHISODON.

2. Preorbital broad, snout blunt, 10 anal rays .. Subg. EUCHISTODUS.

3. Lower pharyngeals quadrate .. .. Subg. HEMIGLYPHIDODON.

4. Scales above lateral line in 1-2 rows .. Subg. AMBLYGLYPHIDODON.

oo. Teeth not emarginate.

p. Teeth in two rows .. .. CHRYSIPTERA.

pp. Teeth in one row .. .. HYPSYPOPS.

ll. More than 30 transverse series of scales .. .. PARMA.

aa. Teeth uniserial, movable, those of lower jaw confined to front portion.

q. Vertical fins not elevated, caudal simply lunate .. .. AZURELLA.

qq. Vertical fins much elevated, caudal lobes falcate .. .. .. MICROSPATHODON.

GENUS DAYA Bleeker.

Daya Bleeker, Verh. Holl. Mij. Haarlem, 1877, p. 71 (*Pomacentrus jerdoni* Day). *Id.* Weber, Siboga Fische, lvii, 1913, p. 343.

This genus differs from *Pomacentrus* in having no scaly sheaths at the bases of the spinous dorsal and anal fins, and the membrane between the spines naked instead of scaly. The edges of the suboperculum and interoperculum are finely serrated like the preoperculum, and the suborbital bones are small and inconspicuous; operculum with two spines. The anterior teeth of each jaw are enlarged, and, though compressed, have more or less rounded points; the lateral teeth small. Snout and mandible naked. Caudal fin forked. Scales in about thirty rows. Membrane of spinous dorsal scarcely incised and without distinct lobes.

DAYA JERDONI Day.

(Plate IX, fig. 1.)

Pomacentrus jerdoni Day, Proc. Zool. Soc. Lond. 1873, p. 237; and Fish. India, 1877, p. 383, pl. lxxx, fig. 7.

Daya jerdoni Weber, Fische Siboga Exped., lvii, 1913, p 344.

Pomacentrus dolii Macleay, Proc. Linn. Soc. N.S.Wales vi, 1881, p. 65, pl. i, fig. 1.

D. xiii/13; A. ii/14; P. 18; V. i/5; C. 15; L. lat. 19; 30 scales between the origin of the lateral line and the hypural joint, 5 between the origin of the dorsal and the lateral line, and 10 more to the origin of the anal.

Depth before the ventrals 2·6 in the length to the hypural joint; head 3·5 in the same. Eye 3·4 in the head and a little longer than the snout, which is 4·2 in the head; interorbital width a little greater than the length of the eye, 3·1 in the head. Sixth dorsal spine 2·1 in the head, longer than the last, but much shorter than the ninth ray; pectoral 1·2 in the head.

Body longer than is usual in Pomacentrids, with the upper and lower profiles equally curved from the obtusely conical snout. Suborbital bones small and inconspicuous, the first wider than the others and hinged with the preorbital; free edge of the preorbital notched and feebly serrated. Hinder edge of the preoperculum serrated, as is that of the suboperculum, and the interoperculum also has a few serrations. Operculum armed with two flat spines, the lower of which is the larger. Each jaw with about six large flattened teeth in a row anteriorly, and a row of much smaller ones on each side; palate toothless. Nostril a simple opening on each side.

Scales ctenoid with narrow ciliated borders. They extend forward on the upper surface of the head to before the middle of the eye, and cover the whole head with the exception of the snout, lips, and mandible. There is an enlarged scale at the base of each ventral fin, and two others are present between those fins. Scales cover the bases of the pectoral fins, and extend up between the dorsal, anal, and caudal rays, but the spinous portions of the dorsal and anal are naked. Lateral line formed by a broad canal, with two or three pores opening on each scale; the scales of the median series on the caudal peduncle also bear minute pores.

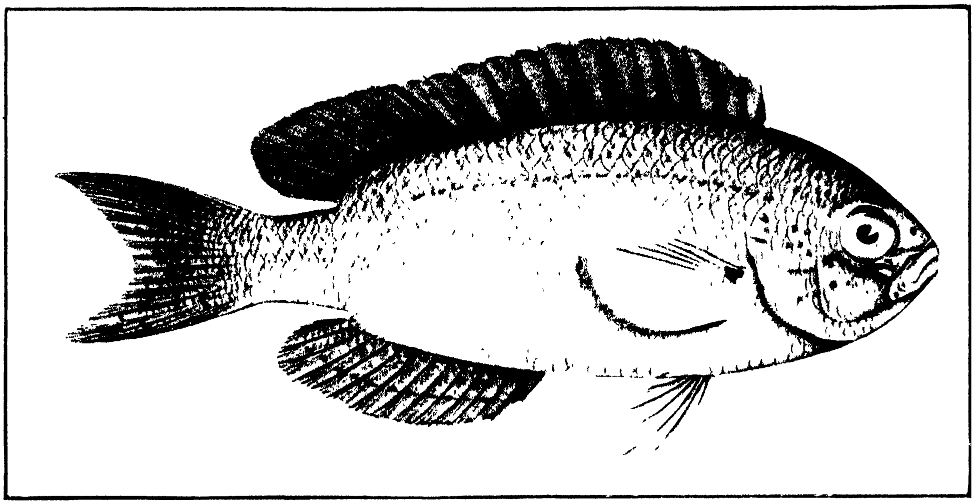

Fig. 1.—Daya jerdoni Day. A specimen 108 mm. long.

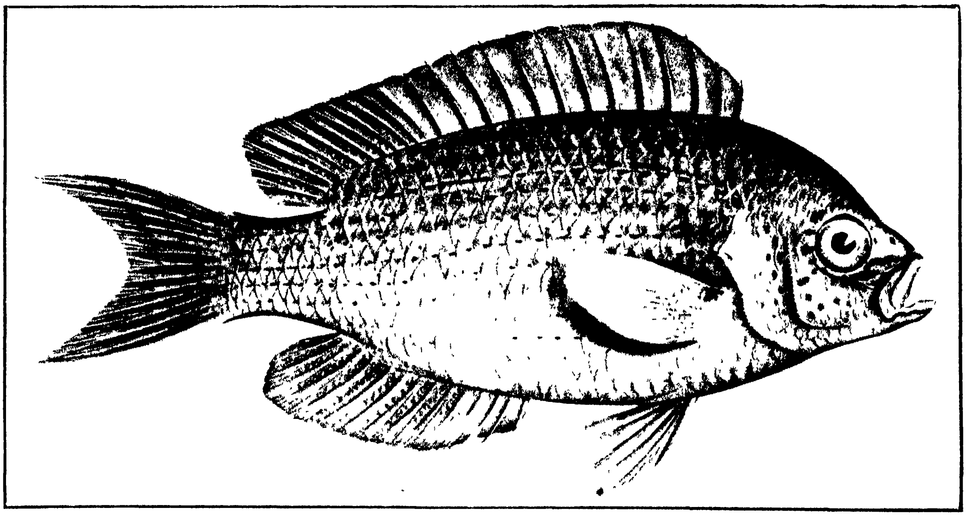

Fig. 2.—Daya jerdoni, var. fusca, var. nov. Holotype of variety, 99 mm. long.

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Face page 170.

Median dorsal spines highest, the others decreasing slightly in length backwards; the rays increase again to the ninth, which is longer than the longest spine. The margin of the dorsal fin is slightly sinuous between the spines, and obtusely pointed posteriorly. Anal similar in form to the soft dorsal. Pectoral rounded, the fifth upper ray longest. Ventrals rounded, without produced rays, and reaching backwards to the vent. Caudal forked.

Colour.—Yellow, with blue spots, the fins darker. The body is much lighter than the fins after preservation, and the scales have olivaceous markings which combine to form the pattern illustrated in the accompanying figure. Two dark stripes cross the preorbital, one extending under the eye, and the cheeks and opercles are marked with dark spots and short lines. A large blackish spot at the upper base of the pectoral. Vertical fins slate-coloured in formaline; the dorsal and anal have narrow white borders followed by a very narrow darker line, and there is a blackish spot between the anal spines: a dark horizontal line extends along the soft portion of each. Caudal with irregular rows of grey spots. Pectorals and ventrals whitish.

Described and figured from a specimen 108 mm. long, which was taken by the Queensland State trawler around the Capricorn Group, Queensland, in 25-30 fathoms. Two others taken with it exhibit some little variation in the degree of colour-marking on the fins, and one bears indications of blue spots on each scale; the extreme outer rays of the caudal fin may also be light-coloured.

Synonymy.—An examination of the two typical specimens of *Pomacentrus dolii* Macleay, in the Macleay Museum, proves them to be similar in all details to the example described above. They were found in a large Dolium shell in Port Jackson, and were doubtless mere stragglers southward from the warmer waters of Queensland.

DAYA JERDONI, var. FUSCA, var. nov.

(Plate IX, fig. 2.)

A series of twenty-one specimens, 59-104 mm. long, which were trawled by the F.I.V. "Endeavour" in Queensland waters, includes several specimens which cannot be separated from those described above; also others which differ somewhat in both form and colour, and others which are intermediate between the two. In a specimen 99 mm. long, which is figured on the accompanying plate, the depth at the ventrals is 2·4 in the length to the hypural joint. The body is brown like the vertical fins, and each scale bears a basal darker (blue) spot. The dark lines on the dorsal and anal are wanting in this specimen, but are indicated in another somewhat larger example. The outer rays of the caudal fin are whitish like the margins of the dorsal and anal.

Although the two forms illustrated differ in their general appearance, they are evidently specifically identical, since other specimens are intermediate between them, and can be as readily assigned to the one as the other.

Localities.—Twenty miles N.N.E. of Double Island Point, Queensland; 30 fathoms.

Thirteen miles S.E. of Cape Capricorn, Queensland; 13 fathoms.

Four to five miles S.E. of Bustard Head Light, Queensland; 11-16 fathoms.

Ten miles N.W. of Bustard Head Light, Queensland; 14-17 fathoms.

Three to seven miles N.W. of Hervey Bay fairway buoy, Queensland; 9-11 fathoms.

Twelve miles N.E. of Bowen, Queensland; 19-25 fathoms.

Port Jackson, New South Wales: types of *P. dolii* Macleay.

GENUS GLYPHISODON Lacepède.

GLYPHISODON PALMERI Ogilby.

(Plate X, fig. 1.)

Glyphisodon palmeri Ogilby, Mem. Qld. Mus., ii, 1913, p. 87, pl. xxii, fig. 2.

As the original figure of this species is imperfect in several details, I have figured another specimen, 135 mm. long from the snout to the end of the middle caudal rays, which is well preserved though it has lost many of its scales. Fourteen specimens, 42-135 mm. long, show that the disposition of the transverse bands and the other characters of the species are very constant, and indicate that *G. palmeri* is a valid species.

Localities.—This species is evidently not uncommon on the Queensland Coast. I have speared it among coral on the surface of the reef at Masthead Island, while the Queensland State trawler has taken it in 25-30 fathoms near the Capricorn Group. It has also been taken in a hauling net on a beach at Cape Bedford and in a reef pool near-by on Two Isles.

Capricorn Group, surface to 30 fathoms. Caloundra. Cape Bedford. Two Isles, off Cape Bedford. Torres Strait. Sweers Island, Gulf of Carpentaria.

FAMILY SCORPÆNIDÆ.

GENUS PARACENTROPOGON Bleeker.

? *Hypodytes* Gistel, Naturg. des Theirreichs, viii, 1848. Genotype uncertain, *vide* Jordan, Gen. Fish., ii, 1919, p. 235.

Paracentropogon Bleeker, Versl. Akad. Amsterdam (2), ix, 1876, p. 297 (*Apistus longispinis*. Cuv. & Val.).

Daia Ogilby, Proc. Roy. Soc. Qld. xviii, 1903, p. 9 (*Centropogon indicus* Day).

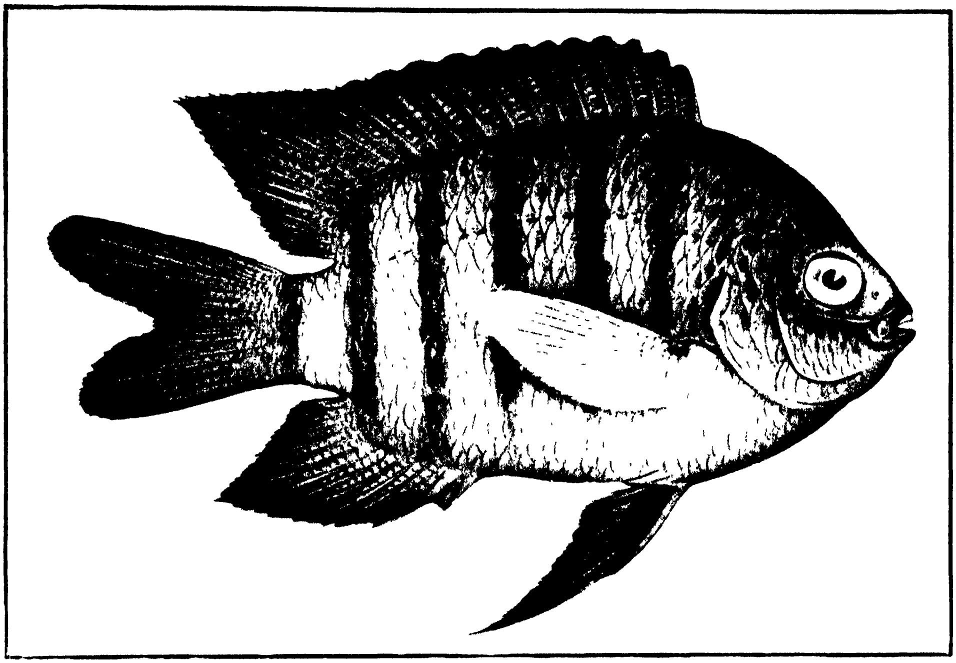

Fig. 1.—GLYPHISODON PALMERI Ogilby. A specimen 135 mm. long.

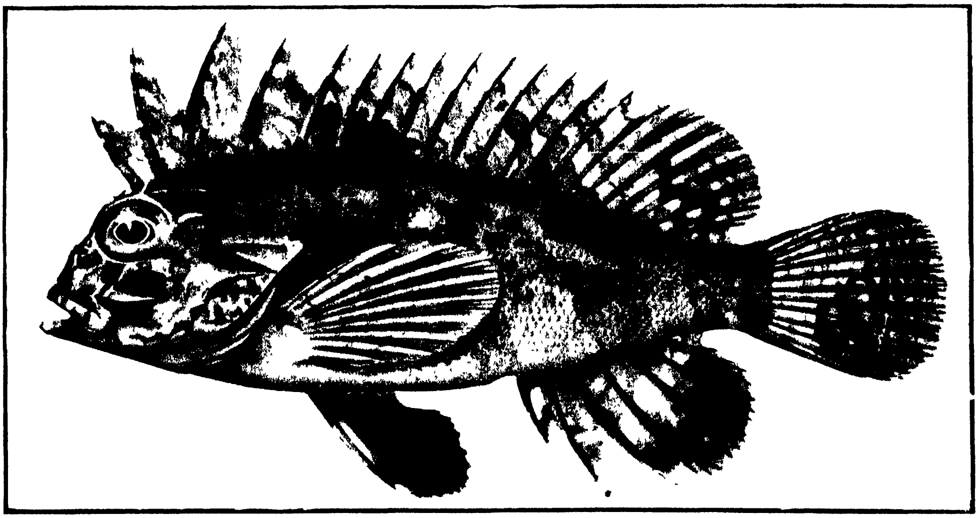

Fig. 2.—PARACENTROPOGON VESPA Ogilby. Holotype?, 87 mm. long.

A. R. McCulloch, del.

PARACENTROPOGON VESPA Ogilby

(Plate X, fig. 2.)

Paracentropogon vespa Ogilby, New Fish. Qld. Coast, 1910, p. 116.

Br. 7; D. xiv/8; A. iii/5; P. 10; V. 1/4; C. 13; 22 tubular pores on the lateral line between its origin and the hypural joint, and 1 on the base of the caudal.

Depth before the ventral fins almost 3 in the length to the hypural joint; head, to the end of the opercular lobe, 2·7 in the same. Eye 3·7 in the head, and slightly longer than its distance from the end of the snout. Interorbital space much less than the length of the snout, 1·5 in the eye. Third dorsal and anal spines equal in length to the anterior dorsal and anal rays, and 1·6 in the head. Pectoral fin 1·1 in the head.

Profile very oblique from the snout to the origin of the dorsal fin, with a depression above the premaxillary processes. Interorbital space with two bony ridges on the upper end of which are two short tentacles; behind these is a median ridge before the first dorsal spine. Supraorbital ridges very prominent, each with a short tentacle. Another ridge extends backward from the upper margin of the orbit, and there are two short ridges between the eye and the origin of the lateral line. Mandible projecting very slightly beyond the premaxillaries. Mouth oblique, maxilla extending backward to below the anterior third of the eye. Anterior nostril situated just behind the middle of the snout, with a short dermal tentacle; posterior nostril preceded by a large open pore, and placed just in front of the eye. Preorbital with two spines directed backward, the anterior short, the posterior large and reaching to below the hinder portion of the eye. Suborbital bone flat and unarmed. Preoperculum with five spines, the uppermost of which extends well beyond the middle of the operculum; the others are small and scarcely project beyond the rounded preopercular edge. Operculum with two diverging ridges which end in obtuse spines; its posterior portion forms a narrowly rounded lobe. Minute pores open on the preopercular margin between each spine, while others are placed symmetrically on the head and neck above and behind the eye, and on the cheek, preorbital, and mandible. A broad band of minute teeth on each of the premaxillaries and one on each side of the mandible; a Λ-shaped patch of similar teeth on the vomer, and a patch on the end of each palatine bone. In the specimen described and figured there is a rounded patch of teeth attached to the palatal membranes in the angle of the vomerine patch, but this is not developed in other specimens. Pseudobranchiæ well developed; no slit behind the last gill-arch.

The back is highest at the base of the fifth dorsal spine, behind which it descends evenly to the caudal peduncle. Head, anterior portion of the back, pectoral region, and abdomen naked, but imperfect scales are present beneath the skin on the greater portion of the sides and caudal peduncle. Lateral line extending in an oblique line from the shoulder to the middle of the caudal peduncle; it forms a complete canal from which minute tubules open obliquely upwards.

First dorsal spine inserted over the middle of the eye; the first five spines are widely separated though connected by membrane; the third is longest, is but little longer than the last, and is as long as the anterior dorsal and anal rays. Soft dorsal rounded, formed of branched rays, of which the last is broadly united with the caudal peduncle by membrane. Anal originating below the twelfth dorsal spine, its third spine as long as that of the dorsal; soft portion rounded, the last ray united with the caudal peduncle. Pectoral formed of branched rays, the median of which are longest and almost reach the vertical of the anal origin. Ventrals inserted behind the bases of the pectorals, each with a strong spine and four branched rays, the longest of which reach the vent. Caudal rounded, with ten branched rays.

Colour-marking.—Light brown after preservation, variegated with darker brown marblings; these are not well defined in the specimen described so they have been copied from another taken with it and of the same size in the accompanying figure. A darker patch is present on the dorsal fin between the fifth and eighth spines, and the whole of the fin is marked with oblique wavy cross-bands. A light spot is situated above the lateral line over the posterior half of the pectorals. Pectorals and caudal with darker cross-bars, the basal portion of the latter whitish. Ventrals blackish with a light patch near the middle of the spine and anterior ray.

Described and figured from a specimen in the "Endeavour" collection, 87 mm. long, of which both the length and data differ from those given by Ogilby. No specimen in the collection agrees exactly with his description, which was prepared under unfavourable conditions on board the "Endeavour," and it is not improbable that this specimen is the actual type of the species.

Affinities.—This species is very similar to *P. longispinis*, with a small and bleached example of which I have been able to compare it, though its third dorsal spine is proportionately shorter. In all other structural details the two appear to be similar, but colour differences may be found which will maintain them as separate species.

P. vespa differs from *P. rubripinnis* in having much finer teeth, lower anterior dorsal spines, better developed scales, and in colouration. The black dorsal spot is largely restricted to the dorsal fin instead of descending onto the back, and the ventrals are dark instead of light in colour.

Localities.—Platypus Bay, Queensland; 7-9 fathoms. "Endeavour" collection, two specimens.

Rat Island, Port Curtis, Queensland; coll. A. R. McCulloch. One specimen with abnormal dorsal spines, but exhibiting all the other characters shown in the figure.

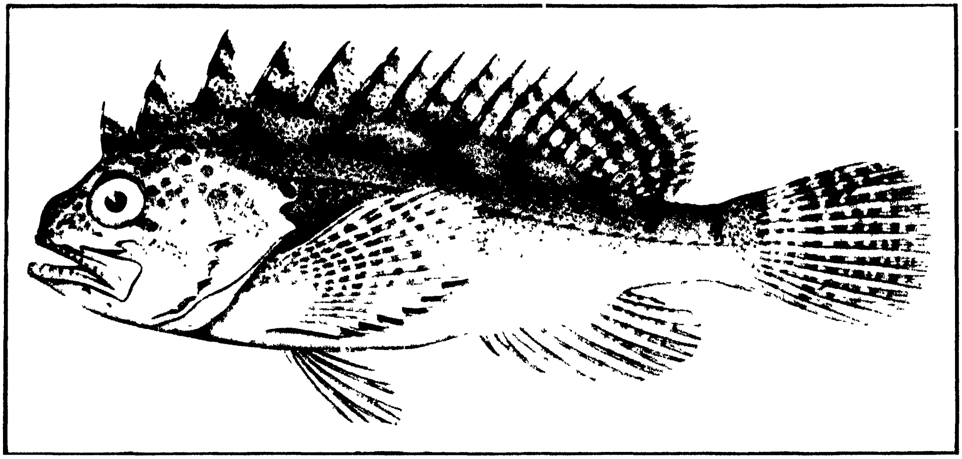

Fig. 1.—LIOCRANIUM SCORPIO Ogilby. Holotype, 75 mm. long.

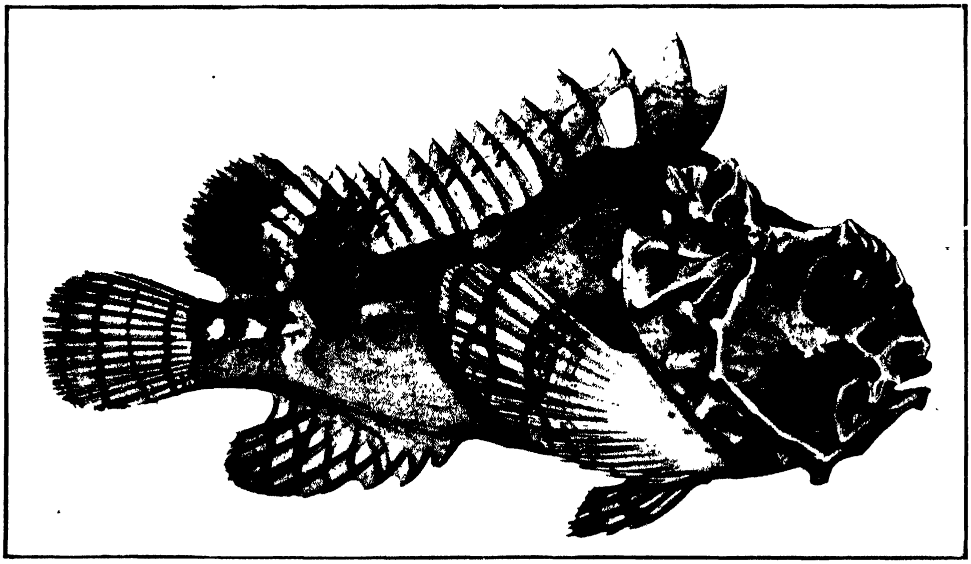

Fig. 2.—EROSA EROSA Cuvier & Valenciennes. Holotype of E. IRIDEA Ogilby, 80 mm. long.

A. R. McCulloch, del.

GENUS LIOCRANIUM Ogilby.

Liocranium Ogilby, Proc. Roy. Soc. Qld., xviii, 1903. p. 24 (Orthotype *L. præpositum* Ogilby).
Id. McCulloch, Biol. Res. Endeavour, iv, 4, 1916, p. 195.

a. Diameter of eye much greater than width of interorbital space; gill-rakers of first arch short, thick, and rounded .. .. *præpositum.*
aa. Diameter of eye much less than width of interorbital space; gill-rakers of first arch long, slender, and flattened .. .. *scorpio.*

LIOCRANIUM SCORPIO Ogilby.

(Plate XI, fig 1.)

Paracentropogon scorpio Ogilby, New Fish. Qld. Coast, 1910, p. 115.

Br. 7; D. xiv/6; A. iii/7; P. 6/8; V. i/4; C. 13; 22 to 24 tubules on the lateral line between the shoulder and the hypural joint.

Depth before the ventrals 3 in the length to the hypural joint; head, to the end of the opercular lobe, 2·6 in the same. Eye 4·3 in the head, slightly shorter than the snout, which is 3·5 in the head. Interorbital width greater than the length of the snout, 3·1 in the head. Third dorsal spine and third anal spine 2·4 in the head, and a little shorter than the fourteenth dorsal spine. Pectoral 1·1, caudal 1·2 in the head.

Snout with a prominent hump caused by the posterior processes of the premaxillaries; interorbital space broad and slightly convex, with a median bony ridge which is bifurcate anteriorly. The back is highest at the bases of the fourth and fifth dorsal spines, and thence descends evenly to the caudal peduncle. Mandible projecting beyond the premaxillaries when the mouth is closed. Mouth oblique; maxilla broad, its hinder margin oblique, the upper posterior angle reaching a trifle beyond the vertical of the hinder margin of the eye. Eye with prominent bony margins. Nostrils in the posterior half of the snout, separated by a narrow interspace, the anterior with a dermal lobe. Preorbital with two spines directed backward, the posterior large and reaching beyond the middle of the eye. Suborbital ridge unarmed. Preoperculum with five spines, the uppermost of which is largest; the others decrease in size downwards, and the lowest is minute. Operculum a weak flat bone without ridges or spines, and terminated by a pointed lobe. Minute pores open on the preopercular margin between each spine, while others are placed symmetrically on the head and neck above and behind the eye, on the preorbital and mandible. A band of villiform teeth in each jaw which is interrupted at the symphysis; vomer with a curved patch of similar teeth, palatines toothless. No slit behind the last gill-arch; about fifteen gill-rakers on the lower limb of the first gill-arch, the posterior of which are slender and flattened and about half as long as the eye.

Skin almost naked, only rudimentary scales appearing on the sides of the body and caudal peduncle. Lateral line extending obliquely from the shoulder to the middle of the caudal peduncle, and terminating on the base of the tail; it forms a complete canal from which small tubules extend obliquely upwards and backwards.

First dorsal spine inserted over the anterior third of the eye; the first four spines are widely separated but connected by membrane, and the third is but little shorter than the last though distinctly longer than those immediately before and after it. The first dorsal ray is as long as the last spine, and is unbranched; the four following rays are bifurcate, while the last is simple and joined by membrane to the caudal peduncle. Anal fin originating below the thirteenth dorsal spine; its spines increase in length backward, and the third is about as long as the last dorsal spine but distinctly shorter than the succeeding rays. Soft portion of the anal rounded; its two outer rays are simple and the others bifurcate, and the last is united with the caudal peduncle by membrane. Pectoral rounded, its middle rays longest and reaching to the vertical of the anal origin; five of the upper rays are bifurcate, and the eight lower ones are simple and thickened. Ventrals inserted behind the bases of the pectorals, each with a strong spine and four weak rays, of which three are bifurcate; the longest does not nearly reach the vent. Caudal rounded, with eleven branched rays.

Colour.—Light brown changing to whitish below, with a paler stripe along the back at the base of the dorsal spines; some very indefinite darker cross-bands are apparent on the back which become more distinct on the caudal peduncle. Some irregularly placed dark-brown spots with lighter edges are scattered over the neck and back above the lateral line, and several lighter ones occur on the scapular region. Upper surface and sides of head closely covered with rounded brown spots with lighter edges, some larger ones of which are situated above the operculum and one at the postero-inferior angle of the eye. Lips crossed by pale-brown narrow bands. Spinous dorsal irregularly marbled with brown, and crossed by oblique darker-brown bands which become narrower and more numerous on the soft portion, and coalesce so as to leave only a series of white spots on the rays. Anal with a few light-brown cross-bars on the rays. Pectoral and caudal fins barred with dark brown. Ventrals whitish.

Described and figured from the holotype of the species, which is 75 mm. long from the snout to the end of the tail. It differs in several small details from Ogilby's description owing to the fact that the latter was written on board the "Endeavour," where the conditions rendered accuracy impossible.

Variation.—A second specimen 79 mm. long differs in having the third dorsal spine distinctly longer than the last; the cross-bands on the back are more distinct, and the spots of the head extend on to the lower portion of the sides of the body. A third specimen, 99 mm. long, has only six anal rays; its light dorsal stripe is more pronounced and it has no dark spots on the back or sides, while the head markings are reduced to brown rings around pale pinkish spots; the fin-markings also are more or less obsolete.

Affinities.—This species differs from *Paracentropogon,* in which genus it was placed by Ogilby, in the absence of palatine teeth and the form of its operculum and pectoral fins. It is clearly related to *Liocranium præpositum* Ogilby. *Paracentropogon cynocephalus* Weber[1] is perhaps only the young of *L. scorpio.*

Localities.—Fourteen miles S.E. of Cape Capricorn, Queensland; 13 fathoms. "Endeavour" collection, holotype.

Near Bowen, Queensland. "Endeavour" collection, paratype.

Capricorn Group, Queensland; 25-30 fathoms. Queensland State trawler.

GENUS SEBASTOPSIS Gill.

SEBASTOPSIS GUAMENSIS Quoy and Gaimard.

Sebastopsis guamensis Jordan & Seale, Bull. U.S. Fish. Bureau, xxv, 1905, p. 374. *Id.* McCulloch, Rec. Austr. Mus. ix 3, 1913, p 388.

Sebastopsis scabra Jordan & Seale, Bull. U.S. Fish Bureau, xxv. 1905, p. 374, fig. 71. (Not *Sebastes scaber* Ramsay & Ogilby.)

Centropogon echinatus Macleay, Proc. Linn. Soc. N.S.Wales, v, 3, 1881, p. 436. *Id.* Ogilby, Proc. Roy. Soc. Qld. xviii, 1903, pp. 8, 9.

An examination of the type of *Centropogon echinatus* in the Macleay Museum proves it to be specifically identical with *Sebastopsis guamensis.* Its identity was suggested to me by Mr. J. Douglas Ogilby in 1916, but, as he does not appear to have recorded the synonymy, I take this opportunity of doing so.

Locality.—Endeavour River Estuary, North Queensland.

GENUS EROSA Swainson.

EROSA EROSA (Langsdorf) Cuvier & Valenciennes.

(Plate XI, fig. 2.)

Erosa erosa Jordan & Starks, Proc. U.S. Nat. Mus., xxvii, 1904, p. 156, fig. 16. *Id.* McCulloch, Rec. Austr. Mus. xii, 8, 1919, p. 177.

Erosa iridea Ogilby, New Fish. Qld Coast, 1910, p. 113.

Br. 6; D. xiv/7; A. iii/6; V. i/4; P. 15; C. 14. Depth at the origin of the dorsal fin 2·1 in the length to the hypural joint. Width of the head between the bony bosses of the cheeks almost as great as its length, which is 2·2 in the length to the hypural joint. Eye shorter than its distance from the premaxillary symphysis, and equal to about half the interorbital width. Third dorsal spine 3·2 in the head and as long as the last, which is considerably shorter than the rays.

Head with bony structures arranged as in the figure; the nape is hollowed out into a large quadrangular depression which is widest posteriorly, and is bounded anteriorly by an interorbital bridge. Maxilla broad and reaching backward to below the posterior third of the eye. A band of villiform teeth on each jaw, and a patch on the vomer; palatines toothless. Gill-membranes broadly united with the isthmus.

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[1] Weber, Siboga Rept., Pisces, lvii, 1913, p. 500, fig. 103.

Back elevated anteriorly, somewhat hollowed in the middle. Body naked, the upper portion of the sides covered with numerous warts and minute papillæ. Lateral line marked by a groove with eleven papillæ along its length, the last being on the base of the tail. A row of papillæ across the base of the pectoral. Each ventral with a rounded knob at the base of its spine.

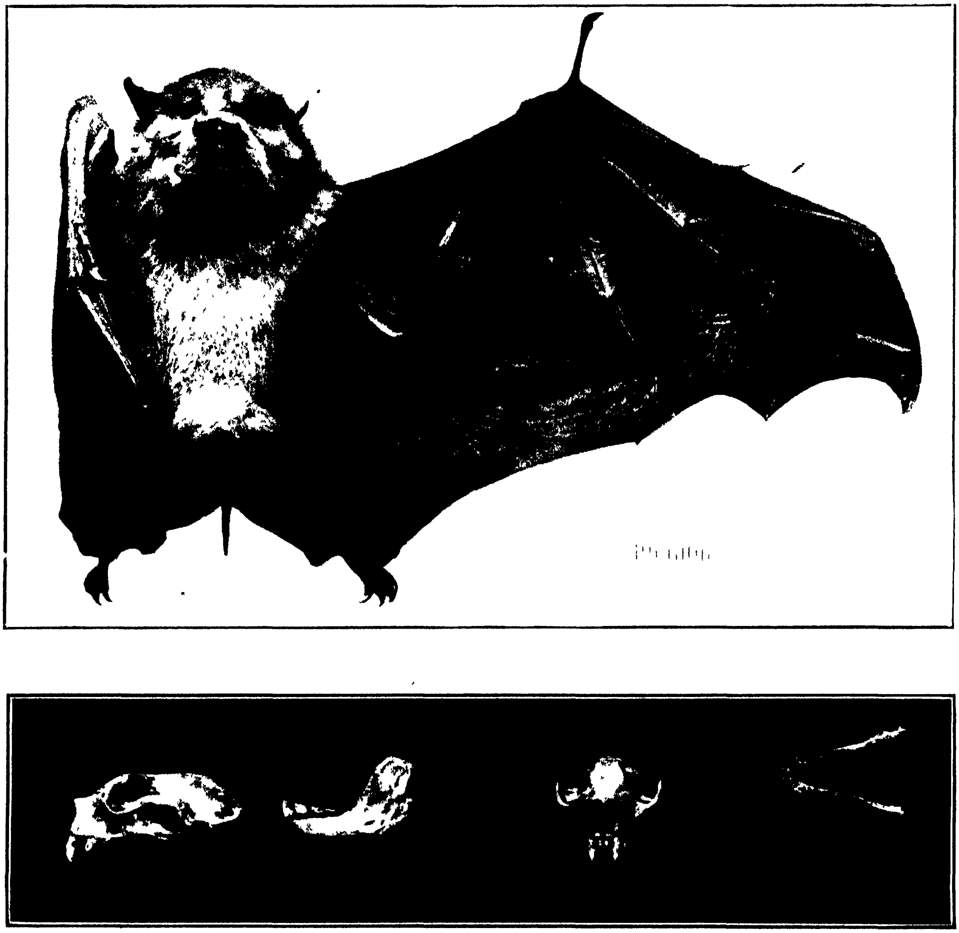
Colour-marking arranged as shown in the figure.

The above characters are taken from the holotype of *Erosa iridea* Ogilby, 80 mm. long, which is figured on Plate XI. A second example, 102 mm. long, only differs in having its colour-markings rather better defined.

Synonymy.—As already noted (*loc. cit.*), I have compared the holotype of *E. iridea* with a small Japanese example of *E. erosa* and find no characters to distinguish them as separate species.

Localities.—Nineteen miles N. 30 degrees W. from Double Island Point, Queensland; 33 fathoms. Holotype of *E. iridea.*

Capricorn Group, off Port Curtis, Queensland; 25-30 fathoms. Queensland Museum.



Nyctimene tryoni Longman.

A NEW NYCTIMENE FROM SOUTH QUEENSLAND.

By Heber A. Longman, F.L.S., Director.

(Plate XII.)

Through the kindly interest of Mr. Henry Tryon, Government Entomologist, the Queensland Museum obtained on October 1, 1920, a new species of *Nyctimene* secured by Mr. D. Lahey at Canungra, near the boundary of our National Park in the Macpherson Range, South Queensland.

Two species of *Nyctimene* (*N. papuanus* and *N. robinsoni* from Cape York and Cooktown respectively) have been previously recorded from North Queensland, but the occurrence of this genus south of Brisbane is somewhat surprising. Since the publication of Knud Andersen's masterly Catalogue of the Chiroptera, vol i, by the British Museum authorities in 1912, the determination of our Megachiroptera has been simplified. Fourteen species have been described, the majority being from Papua and the surrounding islands.

The absence of lower incisors, the presence of tubular nasal appendages, yellow spots in the membranes, a dark dorsal stripe, together with the four circumvallate papillæ, form striking and unmistakable generic characteristics.

NYCTIMENE TRYONI n. sp.

Allied to *N. robinsoni* O. Thomas, but readily distinguished by its general larger size, by the smaller and more circular ears, the greater length (chiefly contained in the metacarpal) of the second digit, the longer tibia, the shorter tail, and other features as set out.

Measured in the flesh, the length from head to tail-tip is 105 mm., and the approximate diameter across wings is 200.

General colour above smoke-gray (Ridgway); bases of the hairs gray: a narrow dark spinal stripe is present; hairs about 10 mm. in length; on the ventral surface the prevailing colour is fawn, but the tips of the hairs give a silver-gray effect; the fur on the flanks and to the proximal third of the fore-limbs becomes fulvous. The characteristic yellow spots of the genus are sparsely distributed on the membranes, but are not so large as in our specimens of *papuanus* and *geminus*.

The ears are evenly rounded, and the antero-lateral margin is scalloped. The tongue has the typical four circumvallate papillæ, the posterior pair being much closer together than the anterior; reflexed tridentate papillæ are present on the median anterior portion. About 20 ridges are developed on the palate; with the exception of the anterior ridge, the first 14 are convex, 3 are fairly straight, the posterior ridges being undulating. There appear to be no very remarkable dental or cranial characteristics. As in *N. robinsoni,* the interorbital portions of the frontals are considerably swollen. The posterior edge of the bony palate is subtriangular. No secondary cusps are developed from the cingulum of the upper canines. Posterior heels are well developed in the third and fourth upper and lower premolars, and the usual inner cusp is present on the third. In transverse section the crowns of p^4 and m^1 are subequal. The angular processes of the mandible are prominent outwardly. An angle of 120° to the base line is formed by the coronoid process.

The specimen is fully adult, and there are no signs of the premaxillary sutures.

Measurements.

Forearm	68
Pollex—	
Total length with claw	32
Metacarpal	16
1st phalanx	12
2nd digit—	
Metacarpal	38
1st phalanx	6
2nd–3rd phalanx, with claw	11
3rd digit—	
Metacarpal	50
1st phalanx	37
2nd phalanx	46
4th digit—	
Metacarpal	45
1st phalanx	28
2nd phalanx	30
5th digit—	
Metacarpal	49
1st phalanx	24
2nd phalanx	26
Ear—	
Length from orifice	16
Greatest breadth, flattened	12
Tail	23
Free portion from dorsal surface	13
Tibia	28
Foot, with claw	17
Calcar	9

Cranial and dental:	
Skull—	
Lambda to gnathion	36
Condylo-basal length	34
Palation to incisive foramina	15·5
Palation to basion	14·5
Rostrum, length orbit to nares	7·5
Rostrum, height at alv. of canine	8
Width of brain-case at zygomata	15
Zygomatic width	23
Across crowns of m^1-m^1, externally	·11
Lachrymal width	9
Across crowns of canines, externally	7
Premaxillæ, depth at symphysis	3·5
Postorbital width	5·5
Interorbital width	6 5
Mesopterygoid fossa, width	5·25
Between p^4-p^4	6·5
Between bases of canines	2·5
Orbital diameter	9·5
Mandible—	
Length from condyle	25·25
Height at coronoid	16·0
Upper teeth, c-m^1, crowns	13·2
Lower teeth, c-m^2, crowns	15

Type in Queensland Museum, Reg. No. *J. 3436,* adult male. Type locality: Canungra, South Queensland.

This latest addition to our non-marsupial mammals is almost certainly descended from early Papuan emigrants, but it has been sufficiently long in the land to become specifically distinct.

A specimen of *N. papuanus* from Cape York in our collections has the forearm 60 mm. in length, being slightly larger than Knud Andersen's maximum. In view of the revision in the latest monograph, Edgar R. Waite's record of "Uronycteris cephalotes" (Records Austr. Mus., iv, 1912, p. 144) should probably be attributed to either *N. robinsoni* or *papuanus.*

On COLEOPTERA, mostly from Queensland.

BY ARTHUR M. LEA, F.E.S., ENTOMOLOGIST, SOUTH AUSTRALIAN MUSEUM.

(Contribution from South Australian Museum.)

(Plate XIII.)

THERE are probably in Queensland more species of beetles than occur in the rest of Australia, and the wealth of life in its coastal districts can be surpassed in but few parts of the world; so far as these are concerned many of the species extend into the "Big Scrub" and Illawarra districts of New South Wales, and in the Far North many New Guinea and Malayan forms occur. Comparatively few districts in Queensland have been well worked for beetles; the Brisbane district (including Mount Tambourine and Moreton Bay islands), Gayndah, Cairns (including Kuranda, Atherton, Malanda, &c.), Rockhampton, Bowen (Port Denison), Cooktown (Endeavour River), Somerset (including Thursday Island), Townsville, and a few other coastal towns have been comparatively well worked, but the islands north of Brisbane and in the Gulf of Carpentaria, and almost the whole of the western districts, have been greatly neglected.

Even in the comparatively well-worked districts the smaller species are often overlooked, the passing collector usually keeping a watchful outlook for large or brilliant species; neglecting the minute forms that must be searched for on sea-beaches, amongst fallen leaves, in moss, associated with ants, and that may be seen in enormous numbers during floods.

Specimens of all the species here described as new are in the collection of the Queensland Museum; many were originally taken by Mr. Henry Hacker, the entomologist of that institution.

FAMILY NITIDULIDÆ.

CYCHRAMUS PICTICOLLIS sp. nov.

Castaneo-flavous, or flavous, some parts more or less deeply infuscated or black. Moderately densely clothed with subdepressed, ashen pubescence.

Head wide; with fairly dense and sharply defined but subasperate punctures; labrum rather feebly bilobed. Antennæ with third joint thinner than second, and about once and one-half as long; club large, almost twice as long as wide. *Prothorax* rather strongly and evenly convex, base more than twice as wide as the median length, sides strongly rounded and very finely margined, hind angles rounded off, apex about half the width of base, and rather deeply emarginate; punctures not quite as dense as on prothorax. *Scutellum* large and semicircular. *Elytra*, when at rest, with outlines continuous with those of prothorax, sides feebly diminishing in width from near base, apex widely rounded; punctures much as on prothorax; nonstriated. Intercoxal process of *prosternum* just passing hind coxæ, its tip truncated; middle coxæ separated slightly more than front ones, and about half the distance of hind ones. *Legs* stout, three basal joints of front and of middle tarsi wide, of the hind ones rather narrow. Length, 3-4·5 mm.

Hab.—Northern Queensland (Blackburn's collection); Brisbane (H. Hacker and C. McGregor). New South Wales: Dorrigo (W. Heron).—Type, *I. 12058* in South Australian Museum; cotype, *C/2270* in Queensland Museum.

The markings of the prothorax readily distinguish this species from *C. niger* and all others known to me. The dark parts vary from rather lightly infuscated to deep black; they irregularly cover the head between the eyes and about two-thirds of the prothorax, so that several pale spots are enclosed in front, and the hind margin has four lobes: the elytra vary from entirely pale, or with the sides faintly infuscated, to almost entirely dark, but usually they have a large obscurely pale triangle about the scutellum; the club (except part of the apical joint) and parts of the metasternum are also dark. The dark markings of the head are usually extended so as to leave but two small pale spots at the base; on one Brisbane specimen the prothoracic markings are reduced to three irregular, disconnected, infuscated spots. On many specimens the abdomen is covered by the elytra, on others part of the pygidium is exposed.

CYCHRAMUS INCONSTANS sp. nov.

Colour and clothing variable.

Head with rather dense but partially concealed punctures; clypeal suture shallow and semicircular; labrum deeply notched. Antennæ long and thin, first joint slightly longer than third, and about thrice the length of second, ninth elongate-triangular, apex incurved, tenth shorter than ninth but of the same width and longer and slightly wider than eleventh, sides gently rounded, apex incurved, eleventh subcircular. *Prothorax* at base more than twice as wide as the median length, sides strongly rounded and finely margined, apex gently incurved to middle, and about two-thirds the width of base; punctures as on head. *Scutellum* rather large and semicircular. *Elytra,* when at rest, with sides continuous with those of prothorax, gently decreasing to apex, leaving most of pygidium exposed; punctures dense, partially concealed, and more or less asperate. Intercoxal process of *prosternum* evenly convex, truncated posteriorly. *Legs* stout, three basal joints of front and of middle tarsi wide, of the hind ones less wide. Length, 4-8 mm.

Hab.—Queensland: Cairns (Macleay Museum, H. Hacker and A. M. Lea); Barron Falls (A. Koebele); South Johnstone River (H. W. Brown).—Type, *I. 12063* in South Australian Museum: cotype, *C/2271* in Queensland Museum.

The long antennæ with loosely articulated club are at variance with other species of *Cychramus,* but as I am not prepared to propose a new genus for the reception of the present species it has been referred to that genus. The seven specimens, under examination, appear to belong to but one species, although no two are alike in their size, colour, and markings. The type is 5 mm. in length, of a dull reddish-brown colour, with two elongated dark spots on the pronotum and some vague infuscations on the elytra; it is rather densely clothed with ashen pubescence, becoming denser on the scutellum, and on an apical triangle on the elytra; the triangle commences on the suture just beyond the middle, and is dilated so as to cover the entire apex; it is distinct on all the specimens and accentuated by a dark oblique line on each elytron immediately before it, although on two specimens the dark lines are very faint. The largest specimen is somewhat paler than the type, and has four spots on the prothorax (the lateral ones very feeble) and one on each shoulder, in addition to the postmedian ones; three specimens are darker, with the dark markings on the prothorax, ill-defined, and the elytral markings connected so as to appear like a reversed M. The smallest specimen is entirely pale, the oblique lines before the apical triangle being represented by semi-nude spaces that are scarcely perceptibly infuscated. On some specimens the club is hardly darker than the rest of the antennæ. The sides of the prothorax are usually widest almost at the base, but on several of the smaller ones the greatest width is median; the emargination of the apex is an even incurvature, not a three-sided incision as on others of the genus; there are vague remnants of striation on the elytra.

GYMNOCYCHRAMUS nov. gen.

Head wide between eyes; clypeus narrow, hind suture obliterated; labrum rather large, deeply bilobed. Eyes fairly large, lateral, prominent, moderately faceted. Mandibles strong, dentate near apex. Antennæ thin; club large, compact, almost circular, three-jointed. Palpi small, approximate at base. *Prothorax* wide, sides finely margined and strongly rounded. *Scutellum* large, semicircular. *Elytra* covering abdomen except part of pygidium. *Prosternum* in middle about half the length of pronotum, ridged along middle in front, produced as an equilateral triangle behind coxæ, the tip of the triangle marking the summit of an acute ridge; coxal cavities large, transverse, each closed by a narrow strip. Metasternum elongate; axillary piece on each side rather wide and traceable, but very narrow, to beyond the middle. *Abdomen* with first segment, along middle, longer than fifth, the others short and equal. *Legs* rather short and stout; femora grooved and edentate; tibiæ with two spines at inner apex, the front ones with a strong spur at outer apex; tarsi with three basal joints, wide and densely clothed on under surface, fourth small, fifth long and thin.

Allied to *Cychramus,* but labrum more conspicuously notched, intercoxal process of prosternum triangular posteriorly, and upper surface polished and glabrous; the notch in the labrum is so deep that, from behind, it appears to extend to the clypeus; there is a groove in front of each eye for the reception of the basal joints of antennæ.

GYMNOCYCHRAMUS POLITUS sp. nov.

Blackish, or dark reddish brown; scutellum, mesosternum, metasternum, abdomen, and antennæ (except club) more or less castaneous. Upper surface glabrous and polished; under surface and appendages sparsely pubescent.

Head across eyes about one-third wider than at base; with fairly dense and sharply defined but small punctures; a deep impression at each side of clypeus; lobes of labrum with a short but distinct fringe. Antennæ with basal joint stout, slightly larger than each lobe of labrum, second small, about half the length of third, and slightly shorter than fourth, ninth and tenth widely triangularly excised at apex, eleventh with its tip slightly produced in middle. *Prothorax* evenly convex, base about twice as wide as the median length, sides strongly rounded and finely margined, apex semicircularly emarginate and about half the width of base, front angles rounded off, hind ones slightly produced and feebly clasping shoulders; towards sides with minute punctures, the middle impunctate or almost so. *Scutellum* impunctate, at base the width of three elytral interstices. *Elytra* at base slightly narrower than prothorax, sides narrowed and finely margined to apex; with rows of distinct but not very large punctures, towards the sides and apex the rows with feeble evidences of striation; interstices with minute punctures. *Abdomen* with a row of punctures at the base of each segment, the apical segment and the pygidium with numerous punctures, slightly coarser than on head. Front tibiæ finely serrated externally, the apical spur slightly curved, and about two-thirds the length of claw-joint. Length, 5·5-6·5 mm.

Hab.—New South Wales: Richmond River, in fungi.—Type, *C/2272* in Queensland Museum; cotype, *I. 12056* in South Australian Museum.

On several specimens the elytra are deep black, on one the head and prothorax are reddish-castaneous, on all of them the scutellum is the palest part of the upper surface. The flap-like margins of the prothorax, as seen from below, are about twice as wide at the base as at the apex.

CIRCOPES VAGANS sp. nov.

Black; antennæ, palpi, and legs more or less castaneous. Densely clothed with depressed ashen pubescence, on the elytra in numerous closely placed series.

Head with fairly dense, partially concealed punctures. Antennæ short, club almost circular. *Prothorax* evenly convex, base more than twice as wide as the median length, sides strongly rounded and very finely margined, hind angles slightly embracing shoulders, apex moderately emarginate, about half the width of base; punctures much as on head. *Scutellum* rather large and semicircular. *Elytra* at base slightly narrower than prothorax, sides feebly diminishing in width to apex; with numerous regular rows of subasperate punctures, becoming irregular about tip; not covering pygidium. Intercoxal process of *prosternum* slightly produced beyond coxæ and obtusely pointed. *Legs* rather short and stout. Length, 2-2·25 mm.

Hab.—Northern Queensland (Blackburn's collection); Cairns (F. P. Dodd); Brisbane (H. Hockings); Stradbroke Island (J. H. Boreham and H. J. Carter); Bribie Island (H. Hacker and A. M. Lea). New South Wales: Dorrigo (W. Heron); Sydney (Lea). Northern Territory: Darwin (W. K. Hunt).—Type, *I. 12042* in South Australian Museum; cotype, *C/2273* in Queensland Museum.

Structurally close to *C. adelopiformis*, but derm of upper surface usually entirely dark. The club of the antennæ is usually infuscated, but is often no darker than the other joints; on a few specimens the basal angles of the prothorax are obscurely reddish, and on many parts of the prosternum and the tips of the elytra are also obscurely reddish. There are about twenty lines of pubescence on each elytron.

CIRCOPES CASTANEUS sp. nov.

Castaneous; under surface, legs, and antennæ somewhat paler than upper surface. Rather densely clothed with depressed pale pubescence. Length, 1·25-1·5 mm.

Hab.—Northern Queensland (Blackburn's collection); Cairns district (E. Allen, F. P. Dodd, H. Hacker, and A. M. Lea); Dunk Island (F. E. Wilson from C. L. Barratt).—Type, *I. 12043* in South Australian Museum; cotype, *C/2274* in Queensland Museum.

Structurally very close to the preceding species, from which it differs in being paler and much smaller; it is also decidedly smaller and somewhat darker than *C. adelopiformis*. The lines of pubescence on the elytra are as numerous as on the preceding species, but the alternate ones are rather less even.

CARPOPHILUS SUTURALIS sp. nov.

Blackish brown; muzzle, sides of prothorax, scutellum, shoulders, sides, suture, and tips of elytra, under surface, legs, antennæ, and palpi more or less castaneous. Moderately clothed with depressed ashen pubescence.

Head with dense and sharply defined but rather small punctures: a small depression on each side in front. Antennæ short, club almost circular. *Prothorax* about once and one-half as wide as long, sides finely margined, parallel on basal half, evenly rounded in front, apex gently incurved to middle; punctures in middle of apex much as on head, somewhat larger elsewhere. *Scutellum* semicircular; with distinct punctures, except at tip. *Elytra* at base slightly wider than median length, sides almost parallel, tips obliquely narrowed to suture; punctures at base more crowded than on base of prothorax, but no larger, becoming smaller and sparser posteriorly. Dorsal portion of *abdomen* subtriangular, and with dense, sharply defined punctures on the two exposed segments. Length, 3-3·75 mm.

Hab.—Northern Queensland (Blackburn's collection); Bribie Island (H. Hacker and A. M. Lea). New South Wales: Sydney (Lea).—Type, *I. 12049* in South Australian Museum; cotype, *C/2275* in Queensland Museum.

An ordinary-looking species, not as dark as *C. planatus*, slightly more convex and with more sharply defined elytral punctures; larger than *C. dimidiatus*, and differently coloured. Some specimens are of a very dark brown, with the paler parts of the upper surface narrow and rather sharply defined; others are paler, almost uniformly castaneous-brown, with the paler parts less defined.

ÆTHINODES VARIABILE sp. nov.

Colours variable. Moderately clothed with depressed, pale pubescence.

Head with dense punctures between eyes (these prominent), a narrow impressed line at base, and two impressions in front. Antennæ rather short, club briefly elliptic. *Prothorax* slightly more than twice as wide as long, base gently bisinuate and about one-fourth wider than apex, hind angles acute and slightly embracing shoulders, sides somewhat flattened, rather strongly rounded in front, apex gently incurved to middle, with fairly dense subasperate punctures of moderate size, becoming smaller in middle of apex and on sides. *Elytra* with outlines continuous with those of prothorax, sides strongly rounded beyond middle, with fairly deep punctate striæ, the punctures larger towards base and striæ deeper towards apex; interstices rather narrow, the alternate ones slightly more elevated. Intercoxal process of *prosternum* continued beyond coxæ, its tip triangular. *Abdomen* with tip frequently uncovered by elytra; basal segment almost as long as three following combined. Length, 2-2·5 mm.

Hab.—Queensland: Cairns district (E. Allen, F. P. Dodd, H. Hacker, No. 929, and C. J. Wild); Mount Tambourine. New South Wales: Ourimbah, National Park (A. M. Lea).—Type, *I. 12051* in South Australian Museum; cotype, *C/2276* in Queensland Museum.

In general appearance like *A. marmoratum* on a greatly reduced scale, but elytral markings differently placed, and third and fifth interstices not terminated before apex. The colour varies from a pale dingy flavous with paler markings on slightly infuscated elytra, to almost black with sharply defined markings on elytra. The darker form, one of which is the type, is piceous brown; muzzle, sides of prothorax, spots on elytra, antennæ (except club), legs, and parts of under surface more or less flavous; there are often eighteen spots on the elytra so placed as to form an irregular circle about the basal half of the suture, a postmedian fascia (the fascia may be composed of connected or disconnected spots), and a semicircle on each side of base; the most conspicuous spots are on each side of the scutellum, and these form parts of the circle and semicircles; on one almost black specimen, the only spots on the elytra are those adjacent to the scutellum. The pale form has parts of the head, prothorax, and under surface slightly infuscated (sometimes scarcely darker than the adjacent parts); the elytral spots may be disposed as on the dark form, although less sharply defined, or so extended that the basal semicircles are entire instead of formed of spots, and the postmedian fascia also entire; on one specimen it is widely advanced along the suture so as almost to touch the semicircles; on some of the pale specimens there are also traces of pale subapical spots. On about half of the specimens there are two shallow impressions on the disc of the pronotum, but on others these are not, or scarcely, traceable. The specimens from Mount Tambourine and New South Wales were all sifted from rotting leaves; the specimen from Mr. Dodd was taken from a sticky seed of *Pisonia brunoniana.*

This species is certainly congeneric with *A. marmoratum,* but it is doubtful if the genus *Æthinodes* can be maintained as distinct from *Lasiodactylus.*

FAMILY TROGOSITIDÆ.

PHYCOSECIS HILLI sp. nov.

Black; under surface, legs, and antennæ of a dingy brown. Upper surface with silvery-white adpressed scales, almost evenly plating the prothorax, somewhat thinner and sublineately arranged on elytra; under surface and legs with sparse pubescence or short setæ.

Head wide. *Prothorax* transverse, hind angles widely rounded off, median lobe wide, semicircular, and concealing head from above. *Elytra* subovate, base slightly wider than widest part of prothorax; with large shallow punctures, each containing and almost concealed by a scale. *Legs* thin, but not very long. Length, 2 mm.

Hab.—Queensland: Townsville (G. F. Hill, No. 1054, and A. M. Lea); Cairns (E. Allen).—Type, *I. 11589* in South Australian Museum; cotype, *C/2277* in Queensland Museum.

In size and general appearance close to *P. ammophilus,* but prothoracic scales not quite as dense, and elytral clothing true scales instead of more or less stout setæ. The derm of the elytra is usually black, but on several specimens is a dingy brown. Ten specimens were obtained at the roots of beach-growing plants.

FAMILY SCARABÆIDÆ.

PHYLLOTOCIDIUM BIMACULIFLAVUM Lea.

A specimen from Dorrigo (in the Queensland Museum) differs from the type in being flavous with a greenish gloss, the gloss very conspicuous on the head, and on some dark markings on the prothorax and elytra; these consist of four spots on the prothorax—a fairly large one on each side of the middle, and a small one on each side; on each elytron there is a small humeral spot and a transverse mark about the middle; only comparatively small parts of the legs are infuscated. A specimen from Comboyne is even paler, on the prothorax only the lateral spots are present, and on the elytra only the transverse ones.

FAMILY MALACODERMIDÆ.

METRIORRHYNCHUS.

The rostrum long, short, or absent, antennæ serrate, pectinate, or ramose, prothorax three-, four-, five-, or seven-areolate, subsutural costa simple, bifurcate or trifurcate, and elytral punctures in single or double series or irregular, are characters amongst which there are so many intervening ones that probably the names *Achras, Cladophorus, Metriorrhynchus, Stadenus, Synchonnus, Trichalus, Porrostoma,* and *Xylobanus* should be regarded as synonymous, or at the most as representing sections of a genus; but as C. O. Waterhouse and others have regarded some or all of them as valid I do not purpose proposing new specific names for some that have been used more than once; these names (of which at least one of each was for an Australian species) are as follows:—

ampliatus (*Trichalus*) Waterhouse, 1877.
ampliatus (*Xylobanus*) Macleay, 1887.
angustulus (*Metriorrhynchus*) Waterhouse, 1879.
angustulus (*Trichalus*) Macleay, 1887.
apicale (*Porrostoma*) Waterhouse, 1877.
apicalis (*Cladophorus*) Macleay, 1886.
apicalis (*Trichalus*) Macleay, 1886.
ater (*Metriorrhynchus*) Waterhouse, 1879.
ater (*Xylobanus*) Macleay, 1887.
lineatus (*Metriorrhynchus*) Hope, 1831.
lineatum (*Porrostoma*) Waterhouse, 1877.
longicornis (*Cladophorus*) Macleay, 1886.
longicornis (*Xylobanus*) Macleay, 1887.
serraticornis (*Lycus*) Fabricius. Syst. Ent. p. 203; transferred by Waterhouse to *Trichalus,* 1877.
serraticornis (*Metriorrhynchus*) Macleay, 1887.

METRIORRHYNCHUS CLIENTULUS Waterh.

Seven specimens from Mount Tambourine, one from Brisbane, and one from the Tweed River agree with the original description and figures of this species, of which only a female was known to Waterhouse, but in his second description the elytra were described as having the apical fifth black, and were so figured. Of the specimens before me three have at least two-fifths black, and one of the others from one-fourth to one-third; as they are certainly conspecific and the markings somewhat variable, it is probable that the type had less of the apex dark than the average. The male differs from the female in having longer antennæ, with the serrations more pronounced, the legs somewhat longer, and in the abdomen.

METRIORRHYNCHUS CŒNOSUS Lea.

Two specimens, from the Queensland National Park, evidently belong to this species, but differ from the types in having the lateral third and rather more than the apical third of each elytron flavous, instead of the margins and tips only.

METRIORRHYNCHUS BASALIS sp. nov.

♂ Black, basal portion of elytra brick-red.

Head with muzzle very short. Antennæ moderately long, third to tenth joints moderately wide and somewhat serrated. *Prothorax* small, conspicuously seven-areolate, sides strongly narrowed to middle; front angles rounded off, hind ones produced and acute. *Elytra* thin, slightly dilated posteriorly; with single rows of large quadrangular punctures, doubled on basal fourth or fifth. Length (♂♀), 5·5-7·5 mm.

♀ Differs in having the antennæ somewhat shorter, wider, and less serrated, and abdomen wider, with the subapical segment not notched.

Hab.—Queensland: Mount Tambourine (H. J. Carter and H. Hacker); Cairns (E. Allen); Atherton and Cedar Creek (Dr. E. Mjoberg).—Type, *I. 12267* in South Australian Museum; cotype, *C/2278* in Queensland Museum.

The pale portion of the elytra varies (independently of sex) from rather less than one-third to slightly more than half, on seven specimens being about one-third, and on another seven about half. In my table[1] would be placed with *M. meyricki* (from West Australia), which has the black of the elytra continued along the suture to the base, instead of abruptly terminated some distance before it. In general appearance it is like *M. ramosus* (which has the antennæ flabellate in the male), *M. simplicicornis, M. dichrous*, and *M. clientulus* (which have less than seven prothoracic areolets), and *M. batesi, M. togatus*, and *M. brisbanensis* (which have the elytral punctures in double series).

METRIORRHYNCHUS MINOR sp. nov.

♂ Black, elytra brick-red.

Head with muzzle produced to form a short rostrum. Antennæ short and very feebly serrated, third joint almost twice as long as wide, the others shorter, but none transverse. *Prothorax* slightly longer than apical width, conspicuously seven-areolate, apex slightly produced in middle, sides rather strongly elevated near base. *Elytra* rather narrow; with single rows of quadrangular punctures, except on basal fourth, where they are doubled, and with rather strongly elevated alternate interstices. Hind *femora* stouter than usual; hind *tibiæ* wide, the apex notched. Length (♂♀), 4-6·5 mm.

♀ Differs in having the antennæ somewhat shorter and wider, hind legs similar to the middle ones, and abdomen not notched.

Hab.—Queensland: Brisbane in December (H. Hacker). New South Wales: Inverell (H. J. Carter from J. Stevens).—Type, *I. 11812* in South Australian Museum; cotype, *C/2279* in Queensland Museum.

The part of the head in advance of the eyes is slightly wider than long; the median areolet of the prothorax is produced so that the carina connecting it with the apex is about two-thirds the length of the other carinæ connected with it; the hind tibiæ of the male are decidedly wider than the others; from some directions they appear to be widest in middle and narrowed to apex, but from others the apex itself is seen to be dilated and notched; the antennæ differ but little sexually. In general appearance like *M. rhipidius* in miniature; the colours are much as in *M. uniseriatus*, with which it would be associated in my table, but distinguished from that species by the very different antennæ, longer (although short) rostrum, irregular punctures at base of elytra, and irregularly elevated costæ, &c. There are nineteen specimens from Brisbane before me and eleven from Inverell.

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[1] Lea; Trans. Ent. Soc. Lond., 1909, p. 51.

METRIORRHYNCHUS TRICAVICOLLIS sp. nov.

♀ Flavous-red; part of head, antennæ, palpi, apical two-fifths of elytra, and abdomen black; tarsi and tips of tibiæ infuscated.

Head with very short muzzle. Antennæ rather short, slightly serrated, thicker and more densely pubescent than usual, second joint minute, third much longer than first and distinctly longer than fourth, the others gradually decreasing in width, tenth slightly longer than ninth, and distinctly shorter than eleventh. *Prothorax* strongly transverse, all margins thickened and strongly elevated (the base less strongly than the others), triareolate, the median areolet connected with base and apex, and unusually wide (about one-third the width of prothorax near its apex); front angles rounded off, hind ones produced and acute. *Elytra* moderately wide; with single rows of large transversely oblong punctures, near base feebly doubled. Length, 5 mm.

Hab.—Queensland: Cairns (A. P. Dodd); Blackall Range in April (C. J. Wild).—Type, *C/2280* in Queensland Museum.

A curious velvety species, very different from any other species before me; in my table it would be associated with *M. basiflavus*, but the prothorax is more transverse, with the median areolet very different, legs paler, &c. Each elytron almost throughout has but five series of punctures, as the doubling of the rows near the base is but faint, the punctures about the apex are irregular, and near the apex the outer row is feebly doubled.

METRIORRHYNCHUS FLAVOLIMBATUS sp. nov.

♂ Black; sides of prothorax rather widely, and much of elytra pale.

Head with muzzle very short. Antennæ rather long, third to tenth joints moderately serrated, third longer than fourth, eleventh slightly longer than tenth. *Prothorax* moderately transverse, seven-areolate, front obtusely produced in middle, sides strongly elevated and narrowed to middle; front angles rounded off, hind ones produced and sharply acute. *Elytra* slightly dilated posteriorly; with double rows of irregular punctures, alternate interstices distinctly elevated. Length (♂♀), 6-11 mm.

♀ Differs in having somewhat shorter and less strongly serrated antennæ, and abdomen not notched.

Hab.—Queensland: Mount Tambourine (H. Hacker, Dr. A. R. Pulleine, and Dr. E. Mjoberg); Killarney (Hacker). New South Wales (J. A. Kershaw); Illawarra (H. W. Cox); Woolgoolga (H. J. Carter).—Type, *I.12268* in South Australian Museum; cotype, *C/2281* in Queensland Museum.

In general appearance close to *M. limbatus,* but the median areolet of the prothorax shorter, and the costæ connected with it differently placed; from each side of the areolet at its widest part a costa extends only halfway to the front margin (instead of towards each side as in *limbatus*); a feeble ridge (hardly a costa) extends across part of the middle from the areolet, so that although seven areolets are indicated only the median one is completely isolated. The extent of black on the elytra varies considerably, but the sides, tips, and part of the suture are pale on all the specimens (eleven) before me; on only one of them the suture is pale to the base; the second stout costa on most of them is pale throughout, for most of its extent it traverses black surface, but near the base and apex the parts traversed are flavous.

METRIORRHYNCHUS QUINQUECAVUS sp. nov.

♂ Black, elytra and sides of prothorax brick-red.

Head with muzzle very short. Antennæ rather long, moderately serrated, third joint slightly longer than fourth, and eleventh slightly longer than tenth. *Prothorax* moderately transverse, five-areolate, median areolet continuous from base to apex, at its widest part a carina connecting it with each side, latero-basal areolets about one-third larger than the latero-apical ones; front angles rounded off, hind ones produced and sharply acute. *Elytra* very little wider near apex than at base; punctures irregular. Length, 7 mm.

Hab.—Queensland: National Park (H. Hacker).—Type, *C/2282* in Queensland Museum.

On each elytron of the type there is a small black stain near the suture, about one-third from apex. The elytral punctures in places are almost in single series, but many of them are like Y's transversely placed; at the basal fourth they are distinctly in double rows, but elsewhere the rows are usually feebly doubled, so that they could not fairly be regarded as being in single series. In general appearance the species resembles *M. lateralis* and *M. irregularis,* but distinguished by the five-areolate prothorax; in *M. flavolimbatus* the central areolet has short spurs, denoting the partial presence of seven areolets, but on this species these are entirely absent.

METRIORRHYNCHUS FRATER sp. nov.

♂ Black, basal three-fourths of elytra brick-red.

Head with long and rather thin rostrum. Antennæ rather long, moderately wide and strongly serrated. *Prothorax* moderately transverse, sharply seven-areolate, apex produced in middle and truncated, sides strongly elevated, angularly narrowed to middle; front angles rounded off, hind ones produced and acute. *Elytra* almost parallel-sided; with regular double rows of punctures, the alternate interstices elevated. Hind *tibiæ* somewhat thickened in middle, lower edge bisinuate, apex thickened and notched. Length (♂ ♀), 10-12 mm.

♀ Differs in having shorter and less strongly serrated antennæ, hind tibiæ not so wide, the apex not thickened, and abdomen not notched.

Hab.—Queensland: Mount Tambourine in November and National Park in December (H. Hacker).—Type, *C/2283* in Queensland Museum; cotype, *I. 12269* in South Australian Museum.

There are many other species of the allied genera having the prothorax and apex of elytra black, but this is the only known one in which the rostrum is long, its length being about two-thirds that of the prothorax; in my table it would be placed with *M. disconiger*, but the black of the elytra is confined to the apex. The hind tibiæ of the male are dilated to the apex as viewed from behind, but they seem to be narrowed there from some directions.

METRIORRHYNCHUS CRYPTOLEUCUS sp. nov.

♂ Black, elytra and sides of prothorax brick-red.

Head with rostrum rather long and moderately wide. Antennæ rather long, strongly serrated, third joint stouter and slightly longer than fourth, eleventh conspicuously longer than tenth. *Prothorax* moderately transverse, distinctly seven-areolate, front somewhat rounded in middle, front angles widely rounded off, sides feebly increasing in width and height to base, but hind angles projecting outwards. *Elytra* almost parallel-sided; with regular double rows of transversely oblong punctures, the odd interstices regularly elevated. Subapical segment of *abdomen* with a wide median notch almost to base. Hind *tibiæ* somewhat thickened. Length (♂ ♀), 14-20 mm.

♀ Differs in having antennæ shorter and less strongly serrated, subapical segment of abdomen not notched, the apical one with a slight median notch at apex, on each side of which is a small elevation, and hind tibiæ thinner.

Hab.—Queensland (National Museum): Mount Tambourine (Dr. E. Mjoberg and A. M. Lea); National Park and Mapleton in November (H. Hacker). New South Wales: Acacia Creek (H. J. Carter).—Type, *I. 12270* in South Australian Museum; cotype, *C/2284* in Queensland Museum.

A rather large species, in some respects close to *M. variipennis*, and elytra sometimes partly dark (on twelve specimens entirely pale), but rostrum somewhat shorter, and sides of prothorax not angularly dilated near base; from above the margins of the prothorax appear to be gently and evenly (except for a feeble sinuation) dilated to the base, from the sides they appear to be gently and evenly convex; but on that species the margins, from all points of view, are seen to be suddenly and angularly dilated near the base. On most of the specimens the sixth and seventh segments of the abdomen, or sometimes only the sixth, have a small waxy-white strip on each side. The rostrum is more than half the length of the prothorax and its upper surface is about twice as long as wide, but the lower surface is dilated at the base. In my table would be placed with *M. lateralis,* from which they differ in being larger and in having the rostrum and antennæ decidedly shorter.

Var.—Four specimens from New South Wales (Dorrigo, W. Heron; and Illawarra, H. W. Cox) have the elytra black, with the sides, apex, and suture pale; the pale parts are somewhat dilated on the shoulders, and continued for a short distance along some of the costæ; about one-fourth or one-fifth of the tips are pale. The size ranges 10-17 mm. and the under parts are as on the typical form. In my table the variety would be associated with *M. variipennis,* from which it differs structurally as the types.

METRIORRHYNCHUS DENTIPES sp. nov.

♂ Black and flavous, inclining to brick-red.

Head with rostrum of moderate length (about as long as its basal width). Antennæ rather long, most of the joints strongly serrated, second minute, third to fifth with some long straggling hairs on under surface, third about twice as long as wide, its tip slightly produced on one side of apex, fourth distinctly shorter than third, and scarcely longer than fifth, their tips more distinctly produced than on third, sixth to tenth with serrations commencing at base. *Prothorax* along middle about as long as greatest width, conspicuously seven-areolate; apex subtriangularly produced in middle, sides subparallel to middle, then dilated to base, hind angles subacute. *Elytra* with regular double rows of punctures, the alternate interstices elevated. *Tibiæ* wide, the hind ones each with a large obtuse tooth about one-third from apex, and a large truncated process on the inner side. Length (♂♀), 8-10 mm.

♀ Differs in having antennæ with shorter and less strongly serrated joints, the subbasal ones without special clothing, abdomen not notched, and hind tibiæ unarmed.

Hab.—Queensland: Coen River (W. D. Dodd).—Type, *I. 11822* in South Australian Museum; cotype, *C/2285* in Queensland Museum.

The pale parts are the prothorax, scutellum, elytra (except from about one-fourth to about one-seventh of the tips), parts of front and of middle legs (on some specimens the only parts of these that are dark are the tarsi, on others the tibiæ and part of the femora are dark, on some more of the middle than of the front legs are dark), and parts of under surface of from three to five basal joints of antennæ; on three males and two females most of the head is pale, on seven other males it is entirely dark. The rostrum is the exact length of that of *M. rufirostris,* noted in my table as of "moderate" length, but the female differs from the female of that species (the only sex at present known) in having the elytra tipped with black, and more of the legs pale; regarding the rostrum as long, the species would be associated with *M. abdominalis*, whose male has very different hind tibiæ; regarding it as short, with *M. fallax,* whose rostrum is distinctly shorter, legs darker and less of elytra black; at first glance it resembles *M. apicalis, M. abdominalis,* and *M. melaspis*; it is, however, distinct from all species of the genus, except *M. tibialis,* by the peculiar hind tibiæ; from *tibialis* itself it is distinct by the larger size, longer rostrum (about twice its length), longer antennæ (of different colour, clothing, and proportions), prothorax and scutellum entirely pale, and more of legs and of elytra pale; the dark part of the elytra is narrowest at the suture, instead of widest there; the projection itself is also somewhat different from that of *tibialis*—it can be partially received into an excavation near the base of the hind femora. The outer walls of the latero-posterior areolets are considerably higher than the others.

METRIORRHYNCHUS FLAVIPENNIS sp nov.

♂ Black, elytra flavous.

Head without distinct rostrum. Antennæ rather long, third to tenth joints feebly serrated (eleventh missing), third slightly longer than fourth, the following ones gradually decreasing in width, but not in length. *Prothorax* moderately transverse; conspicuously seven-areolate; apex slightly produced in middle, sides dilated from middle to base, front angles obtuse, hind ones produced and acute. *Scutellum* with tips produced. *Elytra* thin, almost parallel-sided; each with ten regular rows of punctures, becoming irregular at base and tips. Length, 7 mm.

Hab.—Queensland: National Park in November (H. Hacker).—Type (unique), *C/2286* in Queensland Museum.

A narrow species, at first glance apparently belonging to one of the forms of *M. rufipennis,* with which it would be associated in my table, but the antennæ very feebly serrated (much less strongly than even on the female of that species), and punctures, owing to the non-elevation of the alternate interstices, in ten regular rows on each elytron, instead of in five double rows.

METRIORRHYNCHUS MEDIONIGER sp. nov.

♂ Black, sides of prothorax and most of elytra brick-red.

Head with rostrum very short. Antennæ moderately long, rather wide and rather strongly serrated, but without a tendency to pectination. *Prothorax* about as long as wide; conspicuously seven-areolate; apex obtusely produced in middle, sides feebly dilated to base, front angles widely rounded off, hind ones almost rectangular. *Elytra* feebly dilated posteriorly; with regular double rows of punctures, the alternate interstices elevated. Length (♂♀), 8-10 mm.

♀ Differs in having antennæ somewhat shorter and slightly less serrated, abdomen wider, subapical segment not notched, and legs somewhat shorter.

Hab.—Queensland: National Park in October (H. Hacker).—Type, *C/2287* in Queensland Museum; cotype, *I. 12266* in South Australian Museum.

The prothorax is about as long as wide in the male, but slightly transverse in the female; in my table, therefore, it could not be associated with any of the species of EEE, but it is a rather shorter and more compact one than any of those there noted, and the dark part of the elytra is confined to the scutellar region; on each elytron it extends across three rows of punctures at the base, and across two where it terminates at the basal third; in general appearance it is like some small forms of *M. variipennis,* and of *Trichalus ampliatus.* Parts of the head, and on one male parts of three basal joints of antennæ, are obscurely diluted with red.

METRIORRHYNCHUS APICIVARIUS sp. nov.

♂ Prothorax, scutellum, and elytra (except extreme tips) brick-red, elsewhere black.

Head with very short rostrum. Antennæ with third to tenth joints ramose, and clothed with distinct hairs. *Prothorax* moderately transverse; conspicuously seven-areolate; front obtusely produced in middle, front angles widely obtuse, hind ones almost rectangular, base very little wider than apex. *Elytra* thin; with regular double rows of punctures, alternate interstices slightly elevated. Length (♂ ♀), 8-10 mm.

♀ Differs in having shorter and strongly serrated antennæ, and subapical segment of abdomen not notched.

Hab.—Northern Queensland (H. J. Carter from H. Hacker); Cairns (E. Allen, A. P. Dodd, and Hacker); Gordonvale in July (E. Jarvis).—Type, *I. 12275* in South Australian Museum; cotype, *C/2288* in Queensland Museum.

The ramus of the third joint is more than twice as long as its support, on some of the others it is almost four times as long as its support; the eleventh joint is more than twice as long as the non-ramose portion of the tenth. Three males and one female have the elytra as described, but on two males the elytra are entirely red; these two also have the central areolet deeply infuscated (almost black); one of the males with black tips has the mesosternum, trochanters, and front and middle coxæ flavous. From *M. trichocerus* (which has very similar antennæ) it differs in being more brick-red than flavous, and the elytra entirely pale or with only the extreme tips dark. The difference in the tips of the elytra would distribute the specimens in my table as follows:—Those with the tips black with *M. gracilis,* from the description of which they differ in having much longer antennal rami, all of these being much longer than their supporting joints; those with the elytra entirely pale with *M. miniatus,* from which they differ in having the central areolet much shorter, and the rami much longer.

TRICHALUS GRIFFITHI Lea.

On specimens of this species the black apical portion of the elytra varies from one-sixth to more than one-third in length.

SUBFAMILY LAMPYRIDES.

The fireflies of Australia, on the whole, have not been carefully collected, and of many of the species only males are known; with some species the female is much like the male, except on the under surface; on the female of *Atyphella scintillans* there are no flight wings, and the elytra are greatly abbreviated, and in Queensland there is at least one species with a larva-like female.[1] The species are as follows:—

Both Sexes Known.

Atyphella lychnus Oll.
A. scintillans Oll. (*decora* Oliv.).
Luciola complicata Lea.
L. flavicollis Macl. (*coarcticollis* Oliv., *gestroi* Oliv.).
L. humilis Oliv.
L. platygaster Lea.
L. pudica Oll.

Male only Known.

A. atra Lea.
A. brevis Lea (abundant)
A. flammans Oll.
A. olivieri Lea (abundant).
L. costata Lea.
L. cowleyi Blackb. (abundant).
L. dejeani Gemm. (*apicalis* Boi.)
L. inconspicua Lea.
L. majuscula Lea.

Not Identified in Australian Collections.

L. australis Fab. (*guerini* Cast., *nigripennis* Latr.).

LUCIOLA INCONSPICUA sp. nov.

♂ Of a dingy brown; head and three basal segments of abdomen black, prothorax (one large and some smaller spots excepted), scutellum, and parts of legs of a rather dingy flavous, two apical segments of abdomen white.

Head largely concave and with numerous punctures between eyes. Antennæ with third joint slightly shorter than fourth, and slightly shorter and thinner than second. *Prothorax* about twice as wide as long, apex obtusely produced in middle, a large depression on each side, smaller ones in middle of base, median line distinct; punctures crowded and in places subasperate. *Elytra* parallel-sided to near apex, each with two distinct discal costæ, thickened much like the suture but becoming thinner posteriorly; punctures crowded and somewhat smaller than on prothorax. Length, 5-6 mm.

Hab.—Queensland: Cairns district (E. Allen).—Type, *I. 11845* in South Australian Museum; cotype, *C/2289* in Queensland Museum.

Mr. Allen obtained twenty-eight specimens, all males; at first glance they look close to *L. cowleyi*, but differ in being slightly narrower, prothoracic markings as an isolated spot no wider than the interocular space, and usually narrower, a minute spot on each side, and two or four minute ones at the base; basal segments of abdomen black, and the two apical segments white on both surfaces.

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[1] Mr. E. Allen sent two specimens of it from Cairns. They are much like small females of the European *Lampyris noctiluca*, but as its male is unknown I have not named it.

The elevated parts of the elytra are usually slightly paler than the adjacent surface. The species might almost as well have been referred to ***Atyphella*** as to ***Luciola***; in fact, the phosphorescent portion of its abdomen is exactly as in *A. lychnus.*

ATYPHELLA ATRA sp. nov.

♂ Black; margins of prothorax, and an oblique line on each side of and connected with the base, scutellum, and greater portion of legs of a dingy flavous; two apical segments of abdomen white.

Head almost entirely concealed from above; deeply concave, highly polished and with small punctures between eyes. Antennæ with third joint thinner and slightly longer than second and fourth, sixth to tenth slightly transverse. *Prothorax* about thrice as wide as long, sides strongly rounded and increasing in width to base; surface uneven and with fairly large, shallow, crowded punctures. *Elytra* rather wide, sides feebly dilated, each with three discal costæ, of which the two inner ones are long and almost as stout as the sutural thickening, the other is finer, submarginal, almost as distant from the second as the second is from the suture, commences near the shoulder (this considerably thickened and slightly paler than the adjacent surface), and terminates before the others; punctures dense, sharply defined and somewhat smaller than on prothorax. *Abdomen* with first white segment slightly more than half the length of the preceding one, the following segment considerably longer, with its tip produced in middle. *Legs* thin, but rather short. Length, 6·5-7 mm.

Hab.—Queensland: National Park in November (H. Hacker).—Type, *C/2290* in Queensland Museum; cotype, *I. 12282* in South Australian Museum.

The interocular space and the abdomen (except the two apical segments) are of an intense black, the other black parts have a more or less brownish tinge; the pale margins of the prothorax are very distinct, at the base from each side the elevated part curves round and is directed obliquely inwards for a short distance, but the base between has also a pale marginal strip. Structurally it is close to *A. brevis* and *A. olivieri*; Mr. Hacker obtained twelve specimens, all males.

ATYPHELLA SCINTILLANS Oll.

Mr. H. J. Carter sent for examination a pair of this species, taken *in cop.* on Bunya Mountain. The female is almost entirely pale (the antennæ and elytra are slightly infuscated only), the abdomen has a mottled appearance, as if the phosphorescent material had been irregularly scattered through it (but no doubt would look different on living specimens). The prothorax is slightly larger than on the male, and has the sides and apex conjoined to form an almost perfect semicircle, but the base is somewhat sinuous, the elytra (each of which has two discal costæ) are very short, being less than their combined width; they leave six abdominal segments exposed and most of the preceding one.

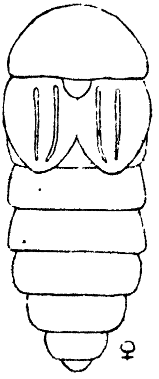

FIG. 1.—*Atyphella scintillans* Oll.

TELEPHORUS VARIIVENTRIS sp. nov.

♂ Flavous; antennæ, palpi, most of elytra, knees, tibiæ, and tarsi black. Densely clothed with short pubescence, golden on the pale parts, blackish on the dark parts.

Head rather wide; with minute punctures. Antennæ rather long, moderately stout, joints after the fourth slightly decreasing in width, and slightly increasing in length. *Prothorax* strongly transverse, disc uneven; with very minute punctures. *Elytra* rather long, almost parallel-sided; with crowded rugose punctures, smaller about base than elsewhere, and with remnants of feeble costæ. Apical segment of *abdomen* deeply notched. *Legs* moderately long. Length (♂ ♀), 7·5-10 mm.

♀ Differs in having the head smaller, with shorter antennæ, rather more of the elytra pale, metasternum and abdomen (except apical segment, which is not notched) black or infuscated, and more of femora dark.

Hab.—Queensland: South Johnstone River (H. W. Brown); Malanda (Dr. E. Mjoberg).—Type, *I. 12207* in South Australian Museum; cotype, *C/2291* in Queensland Museum; others in Stockholm Museum.

In my table[2] would be associated with *T. rubriceps* and *T. rufiventris*; the many species allied to *T. mastersi* differ from it as follows:—*T. mastersi* and *T. froggatti* have base of elytra and part of head black or blackish; *T. mossmani* and *T. macrops* have elytra entirely pale; *T. palmerstoni* has thicker and shorter antennæ, and base of elytra dark; *T. rufiventris* has much less of elytra dark; and *T. rubriceps* has basal joint of antennæ distinctive in the male. On the male the base of the elytra, for a distance about equal to the length of the prothorax, is pale, but the sides are narrowly pale almost to the middle, or even beyond it, and the suture is very narrowly pale also for a short distance.

TELEPHORUS ATRICORNIS sp. nov.

♂ Black and flavous. With rather sparse, ashen pubescence, and fairly numerous, suberect, dark hairs.

Head wide and gently convex between eyes, strongly narrowed to base; with dense minute punctures. Antennæ moderately long, fairly stout, but becoming rather thin towards apex, third joint about half the length of fourth. *Prothorax* slightly longer than wide, disc somewhat uneven, sides and suture thickened. *Elytra* long, thin, and parallel-sided to near apex, sides and suture thickened, a fairly distinct discal costa to beyond the middle; with crowded, rugose punctures. *Legs* rather long and thin. Length (♀♂), 7-13 mm.

♀ Differs in being rather more robust, head narrower across eyes and wider at base, much less of muzzle pale, and legs slightly shorter.

Hab.—Queensland: Mount Tambourine (A. M. Lea). New South Wales (H. J. Carter); Dorrigo (W. Heron); Tweed River (R. Helms).—Type, *I. 9240* in South Australian Museum; cotype, *C/2292* in Queensland Museum.

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[2] Lea, Trans. Ent. Soc. Lond., 1909, p. 113.

At first glance apparently belonging to *T. imperialis,* with which it would be associated in my table, but antennæ decidedly shorter, thicker, and hairier, the ninth and tenth joints no paler than the adjacent ones, apical joint of palpi smaller, prothorax longer, elytra with a distinct costa on each, and the black part at the base rounded posteriorly, instead of truncated. There are numerous specimens of both species before me, and the differences noted are constant. On both species the antennæ are slightly thicker on the male than on the female. On the male the flavous parts are much of the muzzle, a narrow space at apex of prothorax, and more of its base (the basal portion advanced on the sides), elytra (except for a small space at base and another at apex), parts of sterna, much of under surface of abdomen, trochanters, and parts of coxæ. On the male the extreme base of the head is about half the width across the eyes, on the female it is about two-thirds.

HETEROMASTIX PUSILLUS Boh

Five specimens from Mount Tambourine, and one from the Queensland National Park, probably represent another variety of this species; they differ from Sydney (the type locality) ones, in being smaller (2-2·75 mm.), and in having the legs flavous, except that the femora on most of them are partly infuscated. Another, from Brisbane, in the Queensland Museum, measuring 2 mm., has much of the prothorax infuscated.

HETEROMASTIX PALLIPES Lea.

A specimen from the National Park, in the Queensland Museum, appears to belong to this species, but is slightly larger (4 mm.) than the type, the apical joint of its antennæ is slightly stouter, and the two basal joints are dark on the upper surface.

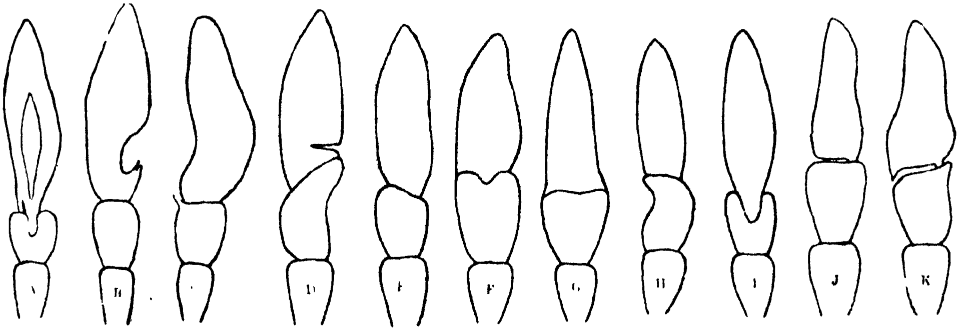

FIG. 2.—Tips of antennæ of species of *Heteromastix.* A, B, C, *spinicornis* Lea; D, E, *melanocephalus* Lea; F, G, *castor* Lea; H, I, *pollex* Lea; J, K, *scutellaris* Lea.

HETEROMASTIX SPINICORNIS sp. nov.

♂ Black, basal two-thirds of elytra flavous. Densely clothed with dark pubescence, becoming golden on pale portion of elytra.

Head with dense and minute punctures. Antennæ moderately long, first joint scarcely longer than third and at apex no wider, second about half the length of third, third-ninth subequal in length and apical width, tenth distinctly wider and with a small spine at inner apex, eleventh longer than ninth and tenth combined, base irregularly compressed. *Prothorax* more than twice as wide as long, distinctly margined throughout. *Elytra* parallel-sided to near apex; with crowded and small rugulose punctures, and vague remnants of costæ. Length, 6·5 mm.

Hab.—Queensland: Mount Tambourine (H. J. Carter).—Type, *I. 11861* in South Australian Museum.

In my table would be associated with *H. luridicollis*, but distinguished from that, as from all other species having the apical joints of antennæ distorted, by the black prothorax and bicolorous elytra. The eleventh joint of antennæ appears to alter in shape with the point of view; from one direction it appears to have a subbasal notch and to be narrower than the tenth joint; on its under surface it has a short longitudinal groove which appears to be continued on to the tenth; the spine on the latter joint, although small, is quite distinct from above.

Var.—Another male, from Mount Tambourine (taken by Mr. Hacker and in the Queensland Museum), has the prothorax entirely pale, the black part of its elytra is slightly advanced near the suture, and decreased towards the sides; as a result it appears to have an almost circular outline. A female (taken by Mr. Carter), also with flavous prothorax, differs from the male in the usual particulars of antennæ, legs, and abdomen.

HETEROMASTIX MELANOCEPHALUS sp. nov.

♂ Black; prothorax, basal two-thirds of elytra, tibiæ, parts of femora and of tarsi, and three basal joints of antennæ flavous. With moderately dense pubescence, varying in colour with the derm.

Head gently convex between eyes (these rather small and prominent), slightly depressed in front. Antennæ moderately long, second joint very short, tenth and eleventh distorted. *Prothorax* almost twice as wide as long, margined throughout, the lateral margins somewhat thickened near apex. *Elytra* almost parallel-sided to near apex; with dense and small, rugulose punctures. Length (♂♀), 4-4·5 mm.

♀ Differs in having the head smaller with shorter and somewhat thinner antennæ, tenth joint similar to the ninth, and their combined length slightly less than the eleventh, only about one-fourth of the elytra black, legs somewhat shorter, and abdomen not notched.

Hab.—Queensland: Bribie Island in August (H. Hacker and A. M. Lea).—Type, *I. 11862* in South Australian Museum; cotype, *C/2293* in Queensland Museum.

In my table would be placed with *H. luridicollis*, from the description of which it differs in being smaller, head entirely black, legs not entirely pale, and in the bright flavous colour of its elytra, of which less of their tips are black. The tenth joint of the antennæ of the male is slightly longer than the ninth, and more produced on one side (and curved on it) than on the other; the eleventh is about as long as the ninth and tenth combined, closely applied to the latter and with a narrow notch on one side near the base, the notch invisible from most directions. Mr. Hacker and I obtained eleven specimens, but only one male.

HETEROMASTIX CASTOR sp. nov.

♂ Black; prothorax, parts of under surface of head, two basal joints of antennæ, tibiæ, and parts of femora flavous; tarsi and part of second joint of antennæ infuscated. With short, ashen pubescence.

Head with a shallow interocular depression. Antennæ rather long and not very thin, tenth and eleventh joints closely applied together. *Prothorax* about twice as wide as long, sides slightly dilated near apex, but scarcely thickened. *Elytra* almost parallel-sided to near apex; with dense and small subrugulose punctures. Length, 3·75-4 mm.

Hab.—Queensland: Brisbane (H. Hacker); Glen Lamington (Dr. E. Mjoberg).—Type, *C/2294* in Queensland Museum.

The tenth and eleventh joints are somewhat distorted but they are so closely applied together that from some directions they appear to be simple; the tenth, however, has a slight apical notch, in which is received a basal process from the eleventh; it is wider than the ninth, slightly longer on one side, and more noticeably on the other: the eleventh is somewhat dilated at the base, and the process received into the tip of the tenth may be regarded as a remnant of a spine; its longest side is about twice the length of the tenth. So little of the muzzle is pale (scarcely more than the labrum) that the species might be regarded as belonging to *ee* of my table,[3] and there associated with *H. gagaticeps,* which has the apical joints very different; but, regarding the muzzle as pale, it would be associated with *H. imitator,* which is a smaller and more fragile species, with thinner antennæ, the eleventh joint of which is much thinner than the tenth.

HETEROMASTIX POLLUX sp. nov.

♂ Black; prothorax, two basal joints of antennæ, and knees flavous. With short pubescence.

Head with two faint interocular impressions. Antennæ rather long and not very thin, two apical joints somewhat distorted. *Prothorax* and *elytra* as described in preceding species. Length (♂ ♀), 3·5-4 mm.

♀ Differs in having the head smaller, antennæ shorter, thinner, and simple, and abdomen not notched.

Hab.—Queensland: Brisbane (H. Hacker). Type, *C/2295* in Queensland Museum; cotype, *I. 12260* in South Australian Museum.

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[3] Lea, Trans. Ent. Soc. Lond., 1909, p. 130.

The black scutellum associates this species in my table with *H. gagaticeps*, which is a larger species, with two apical joints of antennæ somewhat different; to the preceding species it is closer, but the tenth joint of antennæ is different, and the knees are the only pale parts of the legs; the following species has the scutellum and middle tibiæ pale, and the apical joints are not quite the same. The tenth joint on one side is distinctly incurved, with its tip slightly produced beyond the base of the eleventh; on one side it is partly excavated for the reception of the base of that joint; the eleventh is slightly wider than the tenth, but from some directions appears to be of the same width.

HETEROMASTIX MINOR sp. nov.

♂ Black; prothorax, scutellum, mesosternum, legs (tarsi slightly infuscated), and two basal joints of antennæ flavous. With short, ashen pubescence.

Head with a shallow interocular impression. Antennæ not very long, two apical joints somewhat distorted. *Prothorax* and *elytra* as described in *H. castor*. Length, 3 mm.

Hab.—Queensland: Buderim Mountain (H. Hacker).—Type (unique), *C/2296* in Queensland Museum.

The eleventh joint of the antennæ is slightly longer than in *H. decipiens*, and is not quite simple; the tenth is much shorter, but at first glance the type appears to be a small specimen of that species. It is slightly smaller and with antennæ somewhat similar to those of *H. castor* and *H. pollux*, but the scutellum is pale; this character would associate the species, in my table, with *H. pallipes*, which has much longer antennæ, with the terminal joints different. The tenth joint is somewhat similar to the ninth, but is slightly wider at apex, and a little lopsided; the eleventh also is lopsided and somewhat dilated at base, but the two joints are so closely applied together that it is difficult to see their junctional parts.

HETEROMASTIX SCUTELLARIS sp. nov.

♂ Black; prothorax, scutellum, mentum, mesosternum, legs (tarsi infuscated), and under surface of three basal joints of antennæ flavous. With very short pubescence.

Head with two faint longitudinal impressions in front, terminating posteriorly in two faint interocular ones. Antennæ long, two apical joints distorted. *Prothorax* and *elytra* as described in *H. castor*. Length (♂♀), 3·75-4·5 mm.

♀ Differs in having the head smaller, with shorter and simple antennæ, and abdomen not notched.

Hab.—Queensland: Mount Tambourine (A. M. Lea).—Type, *I. 11867* in South Australian Museum; cotype, *C/2297* in Queensland Museum.

The tenth joint of the antennæ of the male is about the length of the ninth, but longer on one side than on the other; the eleventh is constricted somewhat nearer the base than apex, and one side of the base is produced into a short spine on to the shorter side of the tenth; the two joints, however, are so closely applied together that it is difficult to see their junctional parts. In my table would be associated with *H. pallipes,* but from the position in which the basal spine of the eleventh joint is visible, on that species, the apical portion of the joint seems set at a tangent, very different from that of the present species; *H. frater* has a pale scutellum, but its muzzle is also pale; *H. minor* is more fragile, with thinner antennæ, of which the two basal joints are entirely pale; *H. major* is a larger species, with legs mostly dark; *H. castor* has the scutellum black, legs mostly black, and two basal joints of antennæ entirely pale; all these species also differ, *inter se,* in the eleventh joint of antennæ.

HETEROMASTIX TIBIALIS sp. nov.

♂ Black and flavous. With rather dense, suberect pubescence.

Head rather large, with a shallow interocular depression. Eyes large and prominent. Antennæ long and thin, ninth joint slightly longer than tenth, and shorter than eleventh. *Prothorax* about twice as wide as long, margined throughout; with distinct, submarginal punctures. *Elytra* almost parallel-sided to near apex; with dense and sharply defined punctures of moderate size, becoming very small on tips. Front *tibiæ* dilated to apex and notched there, basal joint of front tarsi strongly incurved on one side. Length (♂♀), 5-5·5 mm.

♀ Differs in having the head smaller, with smaller and less prominent eyes, antennæ shorter, subapical segment of abdomen not notched in middle, front tarsi only slightly thickened at apex and not notched, and basal joint of front tarsi symmetrical.

Hab.—New South Wales: Dorrigo (W. Heron); Tweed River (A. M. Lea).—Type, *I. 11870* in South Australian Museum; cotype, *C/2298* in Queensland Museum.

The black parts are the head (except part of its under surface), antennæ, palpi, metasternum, and abdomen; the apical sixth of elytra, apical half of tibiæ, and the tarsi, are more or less deeply infuscated or blackish. In the male the antennæ almost extend to the tips of the elytra; the notch, at the tip of its front tibiæ, has proceeding backwards from it a narrow groove on each side to about the apical third (as if the tibia had been split), the tibia itself is somewhat produced on one side of apex. The general appearance is somewhat as in some forms of *H. luridicollis,* but the antennæ of both sexes are simple.

A male from Queensland (Gympie) appears to belong to this species, but has the flavous parts brighter, almost the whole of the apical half of elytra black, tibiæ infuscated only at tips, the front ones somewhat thicker at apex, not longitudinally impressed near apex, but quite as strongly notched there, and the basal joint of front tarsi longer and more strongly curved.

HETEROMASTIX PUNCTICORNIS sp. nov.

♂ Deep black; head, prothorax, two basal joints of antennæ, and front coxæ bright reddish flavous; front knees feebly diluted with red. With rather dense and short pubescence.

Head with a faint impression near each eye. Antennæ moderately long and rather thin, third to tenth joints each with a puncture on a small polished space near apex on the upper surface. *Prothorax* about twice as wide as long, margins fairly wide at base and sides, but feeble across apex, sides slightly wider near apex than at base, but not thickened; with distinct, submarginal punctures. *Elytra* almost parallel-sided to near apex; with dense and sharply defined punctures of moderate size. Length (♂ ♀), 4-4·5 mm.

♀ Differs in having the head smaller, with less prominent eyes, antennæ shorter, without polished punctate spaces, legs shorter, and in the abdomen.

Hab.—Queensland: Bribie Island in August (H. Hacker).—Type, *C/2299* in Queensland Museum; cotype, *I. 12255* in South Australian Museum.

In my table it would be associated with *H. geniculatus,* from which it differs in being smaller, middle and hind knees and scutellum black, antennæ much shorter, &c.; from *H. compar* it differs in being more robust, with darker legs and scutellum, antennæ slightly stouter, and many of the joints with a polished punctate space. Structurally it is closest to *H. nigripes,* and in appearance it is much like the female of *H. bryanti.* The shining spots on the antennæ from some directions look like granules.

HETEROMASTIX TRICOLOR sp. nov

♂ Head, prothorax, scutellum, two basal joints of antennæ, parts of palpi and front legs (tarsi and tips of tibiæ infuscated) flavous; rest of legs, mesosternum, metasternum, and abdomen black; elytra deep purple. With rather dense pubescence.

Head gently convex, with two feeble impressions in front. Antennæ moderately long and fairly stout, third joint slightly shorter than fourth, eleventh thinner and conspicuously longer than tenth. *Prothorax* about twice as wide as long, sides and base with fairly wide margins, front margin very short. *Elytra* parallel-sided to near apex; with crowded and sharply defined but rather small punctures, becoming smaller at base and apex. Length (♂ ♀), 4·5-6 mm.

♀ Differs in having the head smaller, with less prominent eyes, antennæ shorter and thinner, and abdomen not notched.

Hab.—Queensland: Mackay (Blackburn's and French's collections from R. E. Turner); Mapleton in October, and Brisbane in April (H. Hacker). New South Wales: Galston (D. Dumbrell); Sydney (A. M. Lea).—Type, *I. 12258* in South Australian Museum; cotypes, *C/2300* in Queensland Museum, and in National Museum.

A rather wide species; on several specimens the middle and hind knees, the middle tibiæ, and part of the third joint of antennæ are pale; on one female the scutellum is rather dark. In my table would be placed with *H. anticus* and *H. geniculatus,* from each of which it is distinguished by its greater width and purple elytra; in the latter species the antennæ are also decidedly longer and thinner; the former species is also considerably smaller, with elytra wider posteriorly, and antennæ of male entirely pale.

HETEROMASTIX TARSALIS sp. nov.

♂ Black; prothorax, scutellum, parts of under surface of head, mesosternum, and legs flavous; tarsi and sometimes tips of tibiæ infuscated. With moderately dense pubescence.

Head with slight interocular impressions. Eyes rather large and prominent. Antennæ long and rather thin. *Prothorax* not twice as wide as long, margined throughout; with submarginal punctures. *Elytra* moderately wide, almost parallel-sided to near apex, with dense and sharply defined but rather small punctures. Front *tibiæ* moderately dilated to, and notched on one side of apex; basal joint of front tarsi strongly curved on one side. Length, 4-5·25 mm.

Hab.—Queensland: Mount Tambourine in December and January (H. Hacker and A. M. Lea); National Park (Hacker).—Type, *I. 11875* in South Australian Museum; cotype, *C/2302* in Queensland Museum.

The front legs approach those of *H. tibialis,* but the notch at the apex of the tibiæ is less pronounced, and the incurvature of the basal joint of tarsi is less; the elytra are also entirely black. In my table would be placed at F, from all the species of which it is distinguished by its front legs and pale scutellum; in addition *H. victoriensis* is a narrower species, with much darker legs; *H. pauxillus* has longer and thinner antennæ and black legs; and *H. simplex* has shorter antennæ and darker legs. There are seven males before me, but I have been unable to identify the female amongst the many unidentified ones under examination.

Var.—A male from the Blue Mountains (in Dr. E. W. Ferguson's collection) structurally agrees with the type, but has the femora and tibiæ (except the knees) infuscated.

HETEROMASTIX PUSILLIOR sp. nov.

♂ Black; prothorax, two basal joints of antennæ, parts of under surface of head, and knees flavous. With short pubescence.

Head with two feeble interocular impressions. Antennæ long and rather thin, third to eleventh joints subequal. *Prothorax* about twice as wide as long, margined throughout, lateral margins slightly increasing in width to near apex, where they are slightly thickened; with submarginal punctures. *Elytra* long, thin, and parallel-sided to near apex; with dense and rather small but sharply defined punctures, becoming smaller at base and apex. Length, 2 mm.

Hab.—Queensland: National Park in December (H. Hacker).—Type (unique), *C/2301* in Queensland Museum.

The sides of the prothorax are dilated and thickened anteriorly, but not abruptly as in *H. pusillus* and allied species, so that in my table it would be associated with *H. victoriensis*, *H. pauxillus*, and *H. simplex*, from each of which it is distinguished by its minute size. The tenth joint of the antennæ is slightly thicker than the ninth, but the difference is very slight, and not noticeable from several directions.

LAIUS FLAVONOTATUS Lea.

Specimens of this curious little species were taken by Mr. Hacker on mangroves, at Sandgate, in September.

BALANOPHORUS SCAPULATUS Fairm.

Several specimens, sexes, of this species from the Queensland National Park, and some females from the Richmond River and Dorrigo (New South Wales), have most of the head of a deep shining black, the tarsi and apical parts of middle and hind tibiæ more or less infuscated.

CARPHURUS LONGUS Lea.

C. atricapillis Lea, var.

Numerous specimens, all females, from the Cairns district, convince me that *C. atricapillis* should be regarded as one of many varieties of *C. longus*, and as the latter name was the first used it must be recognised as the typical one, although by no means the commonest. Starting with it the various forms before me, represented by four or more specimens, may be thus noted (the clothing and apical half of antennæ, which are dark on all the forms, not here taken into consideration):—

Form 1, ♀.—Typical *longus*. Entirely pale.

Form 2, ♀.—Like 1, except that half or more of the hind femora are deeply infuscated, or black.

Form 3, ♀.—Var. *atricapillis*. Like 1, except that part of the elytra is black or infuscated; the dark part sometimes continued along the suture for a short distance towards the base, and sometimes encroached upon by the suture; it occupies from one-fourth to three-fourths of the elytra, usually about one-third; occasionally the tip of the abdomen is dark.

Form 4, ♀.—Like 3, but with a conspicuous black or infuscate, slightly curved fascia, connecting the eyes; tip of abdomen always black.

Form 5, ♀.—Head with a fascia as in 3, elytra black, with a wide but somewhat irregular median flavous fascia, metasternum, tip of abdomen and parts of hind legs black, middle legs sometimes partly dark, and some of the other segments of abdomen infuscated in parts.

There is a single specimen with the elytra almost entirely dark, the hind femora and coxæ and part of the metasternum dark, and the interocular fascia distinct; another has the head entirely pale, the elytra entirely dark, and parts of the middle and hind legs and of the metasternum dark.

So many females of this species have been before me that I think it almost certain that I have seen males, but not associated them with the species. If the male is really before me it may be *C. elegans,* of which only the male is known, and which has remarkable front tarsi.

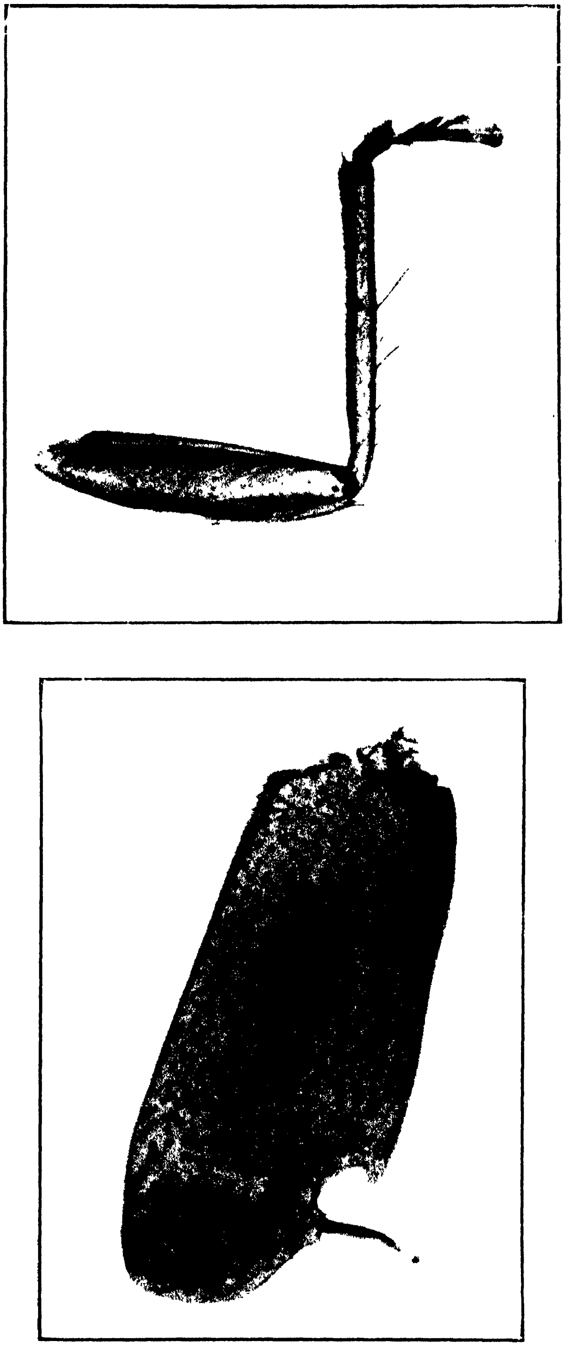
CARPHURUS PISONIÆ sp. nov.

♂ Flavous; two spots near base of head (sometimes conjoined) and metasternum black, five to seven apical joints of antennæ infuscated. With sparse white pubescence and straggling black hairs.

Head rather wide and irregularly impressed between eyes, with two oblique median elevations; with irregular punctures, becoming crowded near eyes. Antennæ moderately long and scarcely serrated. *Prothorax* slightly longer than greatest width (near apex), a shallow open depression near base; with a few scattered punctures. *Elytra* almost twice the length of prothorax, and much wider at base, each side near apex with a deep semicircular notch, the anterior end marked by a subtriangular portion of the elytron, the posterior by a long acute spine directed forwards and outwards; with dense and sharply defined punctures, suddenly terminated near apex. Basal joint of front *tarsi* with a small black comb. Length, 3-4 mm.

Hab.—Northern Queensland (Blackburn's collection); Cairns district, in abundance on sticky seeds of *Pisonia brunoniana* (F. P. Dodd).—Type, *I. 11938* in South Australian Museum; cotype, *C/2341* in Queensland Museum.

Allied to *C. cristatifrons,* and with similar elytral armature, but the head bimaculate and the elytra not; the head from the side appears evenly convex, whereas on *cristatifrons* the strong ridges, abruptly terminated in front, give a very different appearance; its head also has much larger and deeper impressions than the present one. The impressions between the eyes are not very deep; there are two oblique elevations between them, and these, with a feeble longitudinal interocular elevation, appear to form a V (or feeble Y); each fork of the V touches one of the black spots. The spines on the elytra are broken on many of the specimens, and when about half of each is left the notch from some directions appears as an almost circular hole; the part beyond the spines is sometimes of the same colour as the rest of the elytra, but is usually of a lemon-yellow colour, and is impunctate. The abdomen is of a somewhat redder tone than the other pale parts. Under the microscope the tarsal comb is seen to consist of ten or eleven teeth. More than one hundred specimens were removed from the seeds, but all are males.



CARPHURUS PISONIÆ Lea. Upper figure, anterior leg; lower figure, elytron.

Photos.—*H. Hacker.*

CARPHURUS PURPUREIPENNIS sp. nov.

♂ Flavous or reddish flavous; elytra deep purple; mesosternum, metasternum, coxæ, most of femora, and six or seven apical joints of antennæ, black or blackish. With rather long, blackish hairs, rather dense in places; elytra with short, whitish pubescence.

Head rather large, irregularly impressed between eyes, a rather wide and deep impression behind them, a hairy longitudinal ridge crossing its middle, an acute oblique ridge on each side of middle between eyes, a curved and slightly elevated line in front; base punctate and transversely strigose. Antennæ long, moderately stout, most of the joints serrated. *Prothorax* slightly longer than greatest width, a wide shallow subbasal depression; with a few scattered punctures. *Elytra* more than twice the length of prothorax; each side at basal third with a triangular pale-tipped projection; punctures dense and sharply defined, becoming sparser and smaller on tips. Basal joint of front *tarsi* with a black inner comb. Length (♂♀), 6-8 mm.

♀ Differs in having the head smaller, with feeble depressions only, without ridges, and less hairy, apex of prothorax less produced, sides of elytra unarmed, legs and antennæ shorter, and front tarsi simple.

Hab.—Northern Queensland (Blackburn's collection); Cairns (E. Allen and F. P. Dodd); Yarrabah and Mount Bellenden-Ker (Dr. E. Mjoberg).—Type, *I. 12233* in South Australian Museum; cotype, *C. 2303* in Queensland Museum.

Allied to *C. armipennis*, but readily distinguished by the two acute ridges on head; these, when viewed from behind, appear as two conical tubercles. On several specimens the suture near the base is obscurely reddish; the base of the prothorax is sometimes of a different shade of colour from its other parts. On the middle of each elytron of the male, in a line with the lateral teeth, there is a space like a small scar; it appears at a glance to be accidental, but is alike on the six males under examination.

CARPHURUS MACULICOLLIS sp. nov.

♂ Black and flavous, or reddish flavous. With short whitish pubescence and long dark hairs.

Head rather large and unevenly convex, a rather long, shallow, oblique depression each side in front; with unevenly distributed punctures; base transversely strigose. Antennæ moderately long, fourth to tenth joints serrated. *Prothorax* distinctly longer than wide, widest at about apical fourth, apex not much wider than base, a wide shallow depression near base; punctures fairly numerous on sides, sparse elsewhere. *Elytra* more than twice the length of prothorax, sides rather suddenly dilated near base, apex about one-third wider than base; with dense and small, but rather sharply defined punctures, becoming minute on tips. Basal joint of front *tarsi* with an inner comb from base to apex. Length (♂♀), 5-7 mm.

♀ Differs in having the head smaller, with shallower depressions and sparser hairs, eyes much smaller and less prominent, antennæ shorter, legs shorter and front tarsi combless.

Hab.—Queensland: Blackall Range in October (F. E. Wilson); Brisbane (H. J. Carter); National Park (H. Hacker); Mount Tambourine (A. M. Lea).—Type, *I. 12234* in South Australian Museum; cotype, *C/2304* in Queensland Museum.

The eyes of the male are larger and more prominent than usual, their combined width being almost equal to the space between them; on the female their combined width is scarcely half that of the intervening space; on the head of the male the dark hairs form two or three feeble fascicles. The species is close to *C. pallidipennis*, but the male has the head wider, with larger eyes, impressions different, and small black fascicles, elytra with smaller punctures, and a dark spot on each side near the scutellum; in my table the specimens with immaculate elytra would be associated with *C. pallidipennis*, but the spotted ones not with *C. marginiventris*, as the spots are too short and the elytral punctures finer; the heads of the males are also differently sculptured. On typical males the pale parts are the head (except for a transverse black mark near the base—on some specimens owing to the projection of the prothorax it appears to be at the base itself), prothorax (except for a large black spot on each side not quite reaching the base), elytra (except for a rounded black spot on each side of the scutellum), scutellum, prosternum, mesosternum, tips and sides of abdominal segments, three to five basal joints of antennæ, trochanters, knees, and most of tibiæ and tarsi. The typical females are coloured much as the males except that the black part of the head is larger, and that the outer apical angles of the elytra are infuscated, the basal spots are sometimes more extended. On most specimens, of both sexes, there is a dark streak, almost the entire length of the upper edge of the hind tibiæ.

Var. A.—Seven females, from Mount Tambourine, differ from typical females in having the head entirely pale (on one of them there is, however, a very small medio-basal spot), elytra entirely pale, and more of the antennæ dark; they differ from females of *pallidipennis* in being larger, and with smaller elytral punctures; it would, however, be unsafe to identify specimens of either species from females only.

Var. B.—A female, from Mount Tambourine, has the head entirely pale, as also the elytra; except for a slight infuscation on each side near the apex, most of its abdomen is pale.

Var. C.—A male, in the Queensland Museum, has the prothorax and elytra entirely pale; it seems fairly close to the description of *C. xanthochrous* and *C. tachyporoides*, but its scutellum (as on all the other specimens before me) is pale instead of black.

NEOCARPHURUS ANGUSTIBASIS sp. nov.

♀ Black and highly polished; muzzle, basal half of antennæ, and extreme base of prothorax flavous.

Head deeply impressed between eyes; inter-antennary space elevated and subtuberculate. Antennæ rather long and thin, none of the joints transverse. *Prothorax* longer than wide, apex more than twice the width of base, sides strongly rounded and narrowed from apex to near base, and then subparallel to base, which is feebly bilobed, a deep, transverse, open, subbasal depression. *Elytra* slightly wider than widest part of prothorax, in parts slightly undulating; almost impunctate. Basal joint of front *tarsi* lopsided, with an inner comb. Length (♂♀), 2·5-3 mm.

♀ Differs in having the head smaller, without transverse impression, inter-antennary space very feebly elevated, antennæ thinner, and front tarsi simple.

Hab.—Queensland: Cairns district (F. P. Dodd and A. M. Lea); Innisfail.—Type, *I. 9182* in South Australian Museum; cotype, *C/2305* in Queensland Museum.

On several specimens the sides of the elytra near the base are obscurely diluted with red, on one female parts of the legs are obscurely reddish; from four to six apical joints of the antennæ are more or less deeply infuscated. One of the specimens was attached to a sticky seed of *Pisonia brunoniana*. In general appearance the species is close to *N. sobrinus*, but the head of the male is differently excavated, and the inter-antennary elevations differ as follows:—

sobrinus.	*angustibasis.*
From directly in front.	
They appear to terminate on an even line posteriorly, each being separately rounded there.	The median one is posterior to the others and on a lower level.
From behind.	
The head appears to have two small tubercles..	The head appears to have a median flat-topped convexity.
From each side.	
The head appears to have a tubercle before each eye, one behind it and one at its middle, the front one being more conspicuous than the others, which disappear when viewed from a slightly lower elevation.[4]	The head does not appear to have a tubercle behind the eye and at its middle.

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[4] Lea, Trans. Ent. Soc. Lond., 1909, fig. 6.

HELCOGASTER PUNCTIPENNIS Lea.

A male of this species, from Cairns, has only five joints of each antenna dark; by a printer's error[5] the female was described originally as having the head "absolutely" bifoveate in front, instead of "obsoletely"; two other females have the foveæ rather distinct, and one of these has the inner apices of the elytra obscurely testaceous.

HELCOGASTER VARIUS Lea, var. FLAVOPICTUS var. nov.

Four specimens, two of each sex, from Bribie Island, appear to represent another variety of this species; they are rather larger than usual, up to 5·5 mm., and have the pale portion of the elytra larger; their dark parts are a narrow triangle about the scutellum, and the tips for about one-fourth their length at the suture, and sides (but more between); the pale parts of the legs are brighter and more extended than in other described varieties. On the males the black patch at the base of the head is terminated before the sides; on the females there is a narrow irregular reddish line near each eye, and on one of them the two are transversely connected.

HELCOGASTER INSIGNICORNIS sp. nov.

♂ Black and flavous. Upper surface with sparse, dark, erect hairs.

Head wide, with a large excavation behind muzzle. Antennæ with first joint thick, with a fovea near apex; second short, third to fifth rather wide, the following ones rather thin. *Prothorax* about as long as the greatest width, sides dilated from base to apex, near base with a large depression closed behind and at the sides, but shallowly connected, towards each side, with a shallow, latero-apical depression. *Elytra* rather long, with a few inconspicuous punctures. Basal joint of front *tarsi* with a small black comb. Length (♂♀), 2·25-3 mm.

♀ Differs in having the head narrower, with eyes slightly smaller, excavation replaced by a rather shallow depression, that is notched posteriorly in middle; antennæ shorter, basal joint much smaller and non-foveate, third and fifth joints smaller; prothorax with subbasal depression not, or scarcely, connected with latero-apical ones (and these often scarcely defined); and legs shorter, with front tarsi combless.

Hab.—Queensland: Mount Tambourine (A. M. Lea).—Type, *I. 11911* in South Australian Museum; cotype, *C/2306* in Queensland Museum.

Allied to *H. foveicornis,* but basal joint of antennæ of male smaller and of different shape, elytra with a pale basal zone and, at most, only three apical segments of abdomen entirely black. The female is much like females of *H. tuberculifrons, H. simpliciceps, H. maculiceps,* and others having bicolorous elytra, but the male is at once distinctive. On the male the black parts are the apical three-fourths of elytra and the tip (one or two segments) of abdomen; the

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[5] Lea, Trans. Ent. Soc. Lond., 1909, p. 225.

antennæ have from three to five basal joints and the tip of the eleventh pale, the others being deeply infuscated; the head and prothorax are of a slightly redder tone than the other pale parts. The excavation on its head occupies about one-third of the width across eyes, its bottom is somewhat irregular and hind margin semicircular; only the five apical joints of its antennæ are seen to be longer than wide from most directions, but from several the two preceding joints seem also to be longer than wide. On two males the metasternum is dark; on all the females it is dark, and sometimes the mesosternum as well. On many of the females the head, except at base, and upper portion of the first joint of antennæ, are more or less deeply infuscated, on some only the muzzle is infuscated, on nine specimens the head is entirely pale; on several the apical joint of antennæ is entirely dark; the dark segments of the abdomen vary in number from one to three. There are some fine punctures and strigosities behind the eyes, but they could be easily overlooked; there are no sharply defined punctures on the elytra.

One male (also from Mount Tambourine) differs from the others in having the excavation on the head larger, and at bottom with a distinct longitudinal ridge (on the others the bottom of the excavation is obscured by a mealy substance), and the antennæ entirely pale, although the basal joints are paler than the apical ones.

HELCOGASTER HACKERI sp. nov

♂ Black; head, prothorax, and most of antennæ and of legs flavous. Sparsely clothed with white pubescence, and with a few dark hairs.

Head wide, with a large, deep, interocular excavation. Antennæ rather long, moderately serrated, apical joint almost as long as two preceding combined. *Prothorax* distinctly transverse, apex wider than base, near base with a rather wide and deep, closed depression. *Elytra* moderately long; with rather dense and minute rugulose punctures. Basal joint of front *tarsi* with a black inner comb. Length (♂♀), 2·25-3·5 mm.

♀ Differs in being larger, head smaller, without tubercles or excavation, with a shallow depression each side in front, and a shallow median line, punctures sparser and more sharply defined, and black, except that the muzzle is obscurely reddish; the antennæ are thinner and much darker, prothorax with only the base and sides pale, and narrower across apex, abdomen larger and wider, legs with hardly more than the knees pale, and front tarsi simple.

Hab.—Queensland: Bribie Island in August (H. Hacker and A. M. Lea); Brisbane in October (Hacker).—Type, *I. 11905* in South Australian Museum; cotype, *C/2307* in Queensland Museum.

One of the most interesting beetles occurring on the island. It is close to *H. foveiceps,* to which the specimens at first glance appear to belong, but on that species the sub-basal foveæ of the head leave a medio-basal space, which projects subtriangularly forwards, the projection itself longitudinally grooved; on the present species the place of the projection is taken by a rather large depression, which appears on some specimens to extend to the base itself, although it does not do so; from the inter-antennary space a wide and uneven elevation projects subtriangularly backwards into the excavation, and from directly behind the sides of this elevation appear like two minute tubercles (on *foveiceps* a smaller median one may also be seen). I have repeatedly compared the heads of the males from many points of view, and cannot satisfy myself that the two forms belong to but one species, despite the close similarity of all parts but the head, and the curiously coloured antennæ; the females of the two species are practically indistinguishable. The middle of the base of the head of the male is usually black, but, as that part is normally concealed, the head appears to be entirely pale; the antennæ are usually entirely pale, but with the middle joints slightly darker than the others, but sometimes much darker; the tarsi and middle and hind tibiæ are usually distinctly infuscated; on the female the tip of the antennæ is sometimes black, but is usually obscurely paler than the preceding joints. The head of the male is densely punctate, but the punctures are not sharply defined, its prothorax also has fairly numerous punctures towards the sides; on the female those of the prothorax are more distinct but scarcely larger.

HELCOGASTER TRIFOVEICEPS sp. nov.

♂ Flavous; scutellum, abdomen (except tips of segments on upper surface), mesosternum, metasternum, apical half of antennæ, and parts of legs, black or infuscated. With sparse, white pubescence; denser on head and abdomen than elsewhere.

Head wide, with a rather deep, transverse, interocular depression, its posterior margin trisinuate; front with an obtuse elevation having two small tubercles posteriorly. Antennæ moderately long. *Prothorax* distinctly transverse, base much narrower than apex, near base with a large, deep, closed, transverse depression; punctures rather dense on sides, sparse elsewhere. *Elytra* rather short, dilated posteriorly; with sparse, small, rugulose punctures. Basal joint of front *tarsi* with a small black comb at inner apex. Length, 2·5-3 mm.

Hab.—Queensland: Dalby (Mrs. F. H. Hobler).—Type, *I. 12124* in South Australian Museum; cotype, *C/2308* in Queensland Museum.

The sculpture of the head, which, with the prothorax and elytra, are entirely pale, readily distinguishes this species from all previously named ones. At least four of the basal joints of antennæ are flavous, the fifth and sixth are also sometimes scarcely darker; the coxæ and bases of femora are black, the tibiæ are usually slightly infuscated in the middle. The head is opaque, owing to dense punctures; these are individually so small as to be scarcely traceable, and in addition are partly concealed by clothing; from some directions the interocular space appears to have three small foveæ connected by a curved line; from directly in front the median one is seen to be much larger than the others; from behind the two small tubercles on the interocular elevation are quite distinct.

HELCOGASTER TRISINUATUS sp. nov.

♂ Flavous; apical three-fifths of elytra, tip of abdomen, and six or seven apical joints of antennæ black, metasternum infuscated. A few dark hairs scattered about.

Head with a deep interocular excavation, its posterior end trisinuate, a large obtuse tubercle in front; with sparse and small punctures, becoming denser about base. Antennæ rather long. *Prothorax* about as long as the greatest width, base decidedly narrower than apex, a large, rather deep, transverse, closed, subbasal depression. *Elytra* moderately long, almost parallel-sided; with fairly numerous and small but (for the genus) rather sharply defined punctures. Tip of *abdomen* with two small processes. Basal joint of front *tarsi* with a small black comb. Length (♂♀), 2·5-3·75 mm.

♀ Differs in having the head smaller, a shallow fovea representing the middle of the excavation, and a feeble depression on each side, its sides; frontal tubercle much smaller and more obtuse, antennæ shorter and thinner, elytra less parallel-sided, abdomen with the tip simple, and front tarsi combless.

Hab.—Queensland: Cairns district (A. M. Lea).—Type, *I. 11949* in South Australian Museum; cotype, *C/3209* in Queensland Museum.

In my table[6] would be placed with F, from all the species of which it is distinguished by its pale head. At first glance it appears to belong to *H. punctipennis*, but the sculpture of the head of the male is different, and the elytral punctures are smaller; from the male of *H. seminigripennis* it is distinguished by the large cephalic excavation, with its base conspicuously trisinuate, the median sinus wider than the others. Six males and twelve females were obtained.

DASYTES SUBELLIPTICUS sp. nov.

Black, parts of antennæ and of legs flavous. With rather dense, depressed, ashen pubescence.

Head with small and rather dense punctures; with two feeble depressions in front. Antennæ slightly passing base of prothorax, most of the joints transverse. *Prothorax* widely transverse, base and sides finely margined; with very small punctures. *Elytra* at base scarcely wider than prothorax, sides slightly dilated to beyond the middle; with dense and small, but rather sharply defined punctures. Length, 1·75-2 mm.

Hab.—Queensland: Bribie Island (H. Hacker and A. M. Lea).—Type, *I. 12285* in South Australian Museum; cotype, *C/2310* in Queensland Museum.

A minute elliptical species, much like *D. ellipticus* on a greatly reduced scale; in my table,[7] on account of the bicoloured legs, it would be associated with *D. bourgeoisi* (now *D. julesi*), but it is much smaller and wider in proportion; in size it is about equal to *D. corticarioides*. The femora are usually deeply infuscated, except at base and apex; on some specimens the front legs are almost entirely pale; the apical half, or less, of the antennæ is infuscated; on some specimens vague remnants of a subbasal depression may be seen on the pronotum, but from most of them even these are absent.

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[6] Lea, Trans. Ent. Soc. Lond., 1909, p. 215.

[7] Lea, Trans. Ent. Soc. Lond., 1909, p. 240.

FAMILY TENEBRIONIDÆ.

PALORUS EUTERMIPHILUS sp. nov.

Bright castaneous. Upper surface glabrous, under surface almost so.

Head moderately wide, with rather dense punctures. Clypeus with smaller punctures than on rest of head, its hind suture semicircular. Eyes small, without canthi, extreme sides only visible from above but distinct from below. Antennæ scarcely longer than their distance apart, parallel-sided except near base, third to tenth joints distinctly transverse, the eleventh almost as long as wide. *Prothorax* moderately transverse, sides rounded, distinctly dilated to near apex, and finely margined, hind angles rectangular; punctures slightly larger but otherwise as on head. *Scutellum* widely transverse. *Elytra* opaque, parallel-sided to near apex, base wider than base of prothorax, but less than its greatest width; with deep striæ containing rather shallow punctures, interstices acutely costate almost throughout. *Under surface* with dense punctures on prosternum, mesosternum, and sides of metasternum, much sparser and smaller elsewhere. *Legs* short. Length, 2·75-3 mm.

Hab.—Queensland: Townsville, twelve specimens from termites' nest, *Eutermes* sp. (G. F. Hill, No. 1033).—Type, *I. 11588* in South Australian Museum; cotype, *C/2311* in Queensland Museum.

This species should perhaps have been regarded as the type of a new genus, but I am averse from proposing new genera for inquilines except on very strong grounds. The entire absence of a club to the antennæ and the eyes not encroached upon by canthi seem to exclude it from *Tribolium*, to the species of which it bears a strong general resemblance. The antennæ and eyes, except that the latter are smaller, with their edges just visible from above, are much as in several species of *Palorus*. The dilated front of prothorax, and opaque elytra, with acute costæ, are very distinctive amongst the allied genera. The colour is an almost uniform and rather pale castaneous, the antennæ are slightly darker than the head, but the terminal joint is slightly paler.

FAMILY MELANDRYIDÆ.

PAROMARTEON MUTABILE Blackb.

I have previously[8] commented upon this species, but as there are now before me many other specimens, including several sharply defined and more or less constant varieties, it appears desirable to name some of them. The sexes

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[8] Lea, Trans. Roy. Soc. S. Aust., 1917, p. 168.

may be readily distinguished by the abdomen; in the male the middle of the apical segment is gently incurved, in the female that segment is larger, and the tip is evenly rounded. The under surface, except the prosternum, appears to be always deep black.

Var. nigripenne var. nov.—From Victoria (Dividing Range), New South Wales (Sydney and Dorrigo), and Queensland (Brisbane), there are nine specimens with the elytra entirely black or blackish, and the head usually with the basal half black.

Var. apicale var. nov.—Twenty-one specimens, from Brisbane and Bribie Island, have the apical two-fifths of elytra and the basal half of head deep black; the scutellum varies from flavous to deeply infuscated; on some of the males the hind femora are infuscated in the middle.

Var. parvum var. nov.—Four specimens, from Bribie Island, are close to the preceding variety, but are smaller (3 mm. only), and have the apical half of elytra black, but the head and scutellum entirely pale.

Var. fasciatum var. nov.—Five specimens, from Bribie Island, are very small (3-3·5 mm.), and their elytra have two black fasciæ: a complete narrow one at the apical two-fifths, and an interrupted one at the apical fifth; the hind and middle femora are partly black; in the males the head is almost entirely dark, in the females it is entirely pale.

FAMILY MORDELLIDÆ.

MORDELLA BRIBIENSIS sp. nov.

Black; base of antennæ and parts of front legs obscurely diluted with red. Clothed with black and greyish-white pubescence.

Comparatively short. Scutellum semicircular. Pygidium rather short, its apical portion almost parallel-sided and then truncated. Spurs to hind tibiæ unequal. Length, 3-4 mm.

Hab.—Queensland: Bribie Island (H. Hacker and A. M. Lea).—Type, *I. 12132* in South Australian Museum; cotype, *C/2312* in Queensland Museum.

The pale pubescence is uniform on the head, and so placed on the prothorax as to distinctly define three black spots: a large median one and a smaller one on each side; on the elytra it forms a fairly conspicuous narrow basal edging, but elsewhere the pale hairs are scattered thinly and do not form spots; from some specimens, except at the base, they are absent; from the metasternum the pale pubescence is almost absent, and it is absent from a large spot on each side of four basal segments of abdomen. About five joints of the antennæ are transverse. The external sexual differences are feebly defined; the male has the apical portion of the pygidium more parallel-sided, and the front tarsi slightly wider, although thin. In some respects the species is close to some forms of *M. baldiensis,* and it belongs to the same group,[9] but the pale pubescence of the prothorax bounds three sharply defined dark spots, and the pygidium is differently shaped; from the form of *M. nigrans*, with somewhat similar prothoracic markings, it is distinct by the pygidium, its narrow portion being only about half as long as on that species.

FAMILY CANTHARIDÆ.

HORIA CEPHALOTES Oliv., Ent., iii, p. 5, pl. 1, fig. 3.

A specimen labelled "Johnstone Riv.," in Miskin's writing, is a male of this species; remarkable for its wide flat head, and conspicuous jaws. The Queensland locality, however, needs confirmation, as the species is a well-known Javanese insect.

FAMILY ŒDEMERIDÆ.

PSEUDOLYCUS HÆMORRHOIDALIS Fab., var. MARGINATUS Guer.

Form 5.—Three specimens from the Queensland National Park differ from the preceding four forms of this variety in having the sides of the prothorax entirely pale, the dark discal portion is wider at the base than the apex, and the elytra are blackish for a short distance from the base—near the suture on two of them there is a pale spot on each side of the base of the head.

MORPHOLYCUS COSTIPENNIS Lea.

A female of this species, from the Queensland National Park, has the red of the prothorax reduced to a small spot on each side of the base.

COPIDITA MARITIMA Lea.

A specimen, from Bribie Island, and another, from Stradbroke Island, have similar elytra to those of a specimen commented upon as in Mr. Carter's collection, except that there is a slight infuscation on each side of the scutellum; on the Bribie Island one the dark prothoracic markings are conjoined, on the other they are not conjoined across the middle. Another, from Bribie Island (a small male), has the cephalic spot larger than usual, and the derm of both scutellum and elytra entirely black.

COPIDITA TENUICOLLIS sp. nov.

♂ Flavous; three irregular lines on prothorax, elytra (except suture and extreme sides), knees, parts of tarsi and two apical joints of antennæ, black or infuscated. Densely clothed with short, ashen pubescence.

Head rather long, gently convex between eyes, with rather dense and sharply defined punctures, becoming crowded at base, and smaller in front; jaws notched at apex. Eyes large and coarsely faceted. Antennæ long and thin, most of the joints cylindrical, eleventh semi-double. *Prothorax* much longer than wide, sides slightly dilated near apex, base narrowly margined; punctures crowded and larger than on head. *Elytra* much wider than prothorax, parallel-sided to near apex; each with four discal costæ; punctures small and crowded. *Legs* long and thin; tibiæ bispinose at apex; claws each with an obtuse basal appendix. Length, 11 mm.

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[9] Lea, Trans. Roy. Soc. S. Aust., 1917, p. 217.

Hab.—Queensland: Stradbroke Island in December (H. Hacker).—Type (unique), *C/2313* in Queensland Museum.

The elytra are much as in *C. macleayi,* and the prothorax also has three dark markings, but the prothorax itself is decidedly longer and thinner, with much stronger punctures, head immaculate between eyes, and these decidedly larger, and the antennæ entirely pale. On the prothorax the dark part on each side is continuous from base to apex, and widest at the apical third, the median line is thinner, shorter and irregular; the pale sutural portion is slightly wider than the scutellum at the base, and becomes very narrow posteriorly.

COPIDITA NIGRIPENNIS sp. nov.

♂ Flavous, elytra blackish with a vague bluish gloss, parts of tarsi and three spots on prothorax slightly infuscated. Rather densely clothed with ashen pubescence, more conspicuous on elytra than elsewhere.

Head rather long, with dense sharply defined punctures, becoming smaller in front; jaws notched at tips. Antennæ long and thin, second to sixth joints cylindrical (the following ones missing). *Prothorax* long and thin, sides somewhat dilated near apex, base margined and bisinuate; punctures crowded and slightly larger than on head. *Elytra* much wider than prothorax, parallel-sided to near apex, each with four discal costæ, of which the third is scarcely traceable; with crowded and mostly rugose punctures, but many sharply defined. *Legs* long but not very thin; tibiæ unispinose at apex; claws thin, each with a small basal appendix. Length, 10 mm.

Hab.—Queensland: Bribie Island (H. Hacker).—Type (unique), *C/2314* in Queensland Museum.

In some respects close to *C. mira,* but prothorax longer and less dilated in front, and palpi normal; from the preceding species it differs in having the legs thicker, with only parts of the tarsi infuscated, the tibiæ unispinose, and less of elytra pale; the three faint infuscations on the prothorax are across the apical third; the suture is very obscurely and narrowly diluted with red.

DOHRNIA SEMIFLAVA sp. nov.

♀ Black and flavous. Head and prothorax rather sparsely clothed, elsewhere with short, dense pubescence.

Head gently convex between eyes, shallowly depressed in front; with dense and rather small but sharply defined punctures; jaws notched at apex. Eyes rather long and finely faceted. Antennæ long and thin, the joints cylindrical. *Prothorax* about as long as the greatest width (near apex), a narrowly impressed line (dilated in middle) across base, and a shallow depression across apex; punctures as sharply defined as on head, and slightly larger. *Elytra* much wider than prothorax, parallel-sided to near apex, each with four discal costæ; punctures crowded and usually sharply defined, but some transversely confluent. Length, 6-7 mm.

Hab.—Queensland: Brisbane (H. Hacker); Glen Lamington (Dr. E. Mjoberg).—Type, *C/2315* in Queensland Museum; cotypes, *I. 12241* in South Australian Museum, and in Stockholm Museum.

Referred to *Dohrnia* on account of the eyes. The flavous parts of the type are the head between the muzzle and eyes, base of six first joints of antennæ, and under surface of the first two, palpi (except the tips), prothorax (both surfaces), scutellum, basal half of elytra, and legs (except tips of middle and of hind tibiæ, and the middle and hind tarsi, which are infuscated). The specimen in the South Australian Museum is like the type, except that the hind femora are also infuscated; the other cotype has the legs (except the front coxæ) and antennæ entirely dark, and with slightly less of the elytra pale. On all three specimens the dark parts usually have a metallic gloss; only two of the discal costæ are at all distinct on each elytron.

FAMILY CURCULIONIDÆ.

EUOPS TUBERCULATUS sp. nov.

♀ Black, in most parts with a slight purplish gloss.

Head with sparse and irregularly distributed punctures. Eyes large, almost touching in middle. Rostrum rather short, dilated and finely serrated at apex, and narrowed to base. Antennæ short; club stout, about the length of six preceding joints combined. *Prothorax* about as long as basal width, narrowed to apex, a distinct bisinuate punctate line near base, a shallow transverse impression on each side at apical third, a rather large but obtuse tubercle in front of each; sides with distinct punctures, upper surface almost impunctate. *Elytra* not much longer than wide, much wider than prothorax; with somewhat irregular rows of fairly large punctures; third interstice at basal third with an obtuse tubercle, between it and base shallowly depressed, sixth interstice with a small obtuse tubercle at summit of apical slope; each shoulder with an acute conical tubercle, projecting outwards. *Abdomen* irregularly punctate and strigose, four basal segments each with a short, hairy, double stripe across middle; pygidium with rather large punctures on most of its surface. *Femora* stout; front tibiæ bisinuate on lower surface. Length, 3 mm.

Hab.—Queensland: National Park in December (H. Hacker).—Type (unique), *C/2316* in Queensland Museum.

Readily distinguished from all other Australian species by the tuberculate upper surface, with armed shoulders.

FAMILY CHRYSOMELIDÆ.

CHALCOLAMPRA TENUIS Lea.

Mr. Hacker has taken several specimens of this species in the National Park, near Brisbane, and these have the elytral markings not in the form of four abbreviated fasciæ connected with the suture only, but the three apical ones are connected at their outer edge as well, so that there are two pale elliptical spots on each side of the suture (one postmedian and one subapical); on one specimen the two basal fasciæ are free externally, and on another the three apical fasciæ are not quite connected externally, so that the spots are not entirely enclosed.

DITROPIDUS DAVISI Saund.

This species is abundant in South Australia and is very variable in size and markings; the length ranges 2·25-3·75 mm.; the width, apart from sex, also varies, the smaller specimens being decidedly narrower than the larger ones. The male is narrower and less robust than the female, its abdomen is smaller, nonfoveate, incurved to the middle, and with the tips of the pygidium slightly produced forwards; the seriate punctures on the elytra are really rather small, but owing to "waterlogging" appear to be decidedly large; their true sizes may be seen from an oblique direction. All the forms have the intercoxal process of the prosternum semicircularly emarginate posteriorly, with the hind angles sharply produced; the legs and parts of the under surface are also variable, but, disregarding these, some of the forms before me are as follows:—

Typical.—On this form (a rather rare one) the prothorax is immaculate, the head is dark at the base, and the elytra have the base, apex, and suture dark, so that each elytron has a large pale spot, but each spot is sometimes greatly reduced in size and sharpness. *Hab.*—New South Wales and South Australia.

Var. A.—Like the typical form, except that the head is entirely pale; on one specimen the elytral spots are greatly reduced in size and brightness. *Hab.*—South Australia (Ooldea and Port Lincoln).

Var. B.—Like the typical form, except that it is not quite so wide, and that the prothorax has a transverse black or blackish fascia extending almost to its sides; the fascia varies from about one-third the length of the segment to covering its entire surface except for narrow edgings, occasionally it actually touches parts of the sides; the elytral spots on such specimens are usually greatly reduced in size, and the black part of the head is greatly extended; on one specimen of it the prothoracic fascia appears as three semi-detached spots; on another the fascia appears as a slight and rather narrow infuscation. *Hab.*—South Australia.

Var. C.—Like the preceding variety, except that the prothoracic fascia is broken up into two spots. *Hab.*—South Australia (Adelaide and Lucindale).

Var. D.—Prothorax entirely dark, head dark except for parts of muzzle;

a fairly large but ill-defined pale spot on each elytron; one female of the variety is still attached to a male of B; another female has a part of the scutellar lobe pale; one male from Gladstone (Queensland) of the variety agrees perfectly in outlines with the typical male, but has distinctly coarser punctures on both prothorax and elytra; its elytral spots are very obscurely defined, and the legs and prosternum are almost entirely dark. *Hab.*—Queensland, New South Wales, South Australia.

Var. E.—Head and prothorax coloured as on the typical form, but elytra with the red extended to cover most of the surface, excluding a rather narrow but somewhat zigzag strip at the base; the suture is also very narrowly dark, but near the apex the dark part is dilated to form an oval spot; the apex, however, is entirely pale. *Hab.*—Queensland (Charters Towers).

Var. F.—Head and prothorax entirely pale reddish flavous, except that the base of the latter is very narrowly black; elytra flavous, the base and suture very narrowly black, a narrow part of the apex black, but the black part slightly advanced along the suture and sides, so as to be strongly bisinuate on its inner edge. On this variety, except for the claws, the legs are entirely pale. *Hab.*—South Australia (Moonta).

There are other varietal forms before me, but I have not considered it advisable to attach letters to those of which I have seen but one specimen. It is probable that several published names will have to be treated as synonyms of the species.

DITROPIDUS IGNITUS sp. nov.

♂ Brilliant coppery red, in places coppery green, under surface and legs black, with a bluish gloss; labrum and basal half of antennæ reddish. Under surface and legs with rather sparse pubescence.

Head with sharply defined punctures of medium size; median line distinct. Eyes separated about the length of two basal joints of antennæ. *Prothorax* at base more than twice as wide as the median length, sides strongly rounded; with dense, sharply defined, and not very small punctures. *Elytra* not much longer than the basal width, which is almost twice that of the apical; with rows of not very large punctures, on the sides set in deep striæ; interstices with small and fairly numerous punctures. *Legs* moderately stout, front ones slightly longer than hind ones. Length (♂ ♀), 2·5-3 mm.

♀ Differs in being slightly more robust, eyes about one-third more distant from each other, elytra less narrowed posteriorly, legs somewhat thinner, the front ones no longer than the hind ones, and in the abdomen.

Hab.—Queensland: Cairns (E. Allen); Bowen (Aug. Simson).—Type, *I. 10925* in South Australian Museum; cotype, *C/2317* in Queensland Museum.

A beautiful, briefly oblong-elliptic species, in general appearance close to *D. venustus* and fairly close to *D. costatus,* but distinguished from both by the non-strigose sides of prothorax; the punctures there are not even confluent, and are mostly slightly smaller than those in the middle. The eyes of the male are more widely separated than in the male of *D. doriæ*. From some directions the head appears coppery red, from others coppery green; from some the prothorax appears coppery green throughout, but usually only the sides appear to be of that colour; the scutellum and tips of elytra, the latter varying with the point of view, are also coppery green; the pygidium similarly varies from coppery green to coppery red. In some lights most of the upper surface of some specimens appears purple. The seriate punctures on the elytra are about as long as those on the prothorax, but narrower.

Vars.—One male has the head, prothorax, and pygidium purple, the prothorax in some lights with a bluish gloss, its scutellum and elytra are bright coppery green, except the tips of the latter, which are purple, its tibiæ are obscurely diluted with red in parts; a female mounted with it has the head and prothorax coppery green, the muzzle of the former and the sides of the latter purplish in some lights, its elytra are deep blue, with the sides and punctures purplish, the purple from some directions appearing to cover almost the whole surface, its pygidium is blue and purple. The only specimen from Bowen, in the Museum, is a male, and has the whole of the upper surface and pygidium deep blue, altering to purple; from some directions the prothoracic specimens have a coppery glitter (as on *D. striatipennis*); its head is slightly pubescent. The bluish specimens differ from the description of *D cærulescens* in the colour of the clypeus and legs, and in the punctures of the prothorax.

DITROPIDUS SOLITUS sp. nov.

♂ Black with a bronzy gloss, basal half of antennæ reddish, the apical half infuscated or black, labrum and basal half of front femora obscurely reddish. Head, under surface, and legs with sparse pubescence.

Head with dense punctures at base and on clypeus. Eyes large and close together. *Prothorax* as wide at apex as along the middle, with fairly dense and rather small but sharply defined punctures in middle, becoming larger but not confluent on sides. *Elytra* subquadrate; with rows of rather large punctures, becoming larger and set in deep striæ on the sides; interstices with very minute punctures. Front *legs* slightly longer than hind ones. Length (♀♂), 2-2·25 mm.

♀ Differs in being more robust, elytra less narrowed posteriorly, and with smaller seriate punctures, front legs no longer than hind ones, and abdomen foveate.

Hab.—South Australia: Mount Lofty (S. H. Curnow, A. H. Elston, and J. G. O. Tepper); New Mecklenburg and Adelaide (Tepper); Moonta and Kilkerran (Blackburn's collection No. 1318); Parachilna (Natural History Expedition, 1917); Quorn (Elston). Victoria: Dividing Range (Blackburn). New South Wales: Sydney (Dr. E. W. Ferguson and A. M. Lea); Forest Reefs (Lea).—Type, *I. 10846* in South Australian Museum; cotype, *C/2318* in Queensland Museum.

A feebly metallic species, with eyes close together, those of the male being separated slightly less than the length of the basal joint of antennæ, in the female about equal to that of the two basal joints; on many specimens the bronzy gloss is hardly in evidence, on some the prothorax has a distinct coppery gloss; the front legs are often entirely dark, and occasionally the labrum is conspicuously red. The punctures at the apex of the prothorax are sometimes almost as coarse as those on the sides; the metasternum is shining, and with sparse, sharply defined punctures in the middle, but the sides appear shagreened, owing to the dense and somewhat asperate punctures there. It is close to *D. quadratipennis,* but is smaller, less metallic, with smaller punctures and interocular space not quite the same; also about the size of *D. odewahni,* but with coarser punctures, darker legs, and eyes much closer together.

DITROPIDUS TROPICUS sp. nov.

♂ Black, basal half of antennæ and sides of labrum reddish. Head, under surface, and legs with sparse white pubescence.

Head with rather dense partially concealed punctures, median line rather distinct. Eyes rather close together. *Prothorax* not twice as wide as the median length, sides strongly rounded; with dense and sharply defined but not very large punctures, becoming larger but not confluent on sides. *Elytra* subquadrate; with series of rather large punctures, on the sides set in deep striæ, the interstices between which are costiform posteriorly, the other interstices impunctate or almost so. Front *legs* scarcely longer than hind ones. (Length (♂♀), 2-3 mm.

♀ Differs in being more robust, elytra less narrowed posteriorly, and with smaller punctures, legs slightly shorter and thinner, and abdomen foveate.

Hab.—North-west Australia (Blackburn's collection); Roebuck Bay (H. H. D. Griffith, his No. 3304, and C. French). Queensland: Thursday Island (G. E. Bryant); Cairns (E. Allen); Bowen (Aug. Simson, his No. 88).—Type, *I. 10903* in South Australian Museum; cotype, *C/2319* in Queensland Museum.

A feebly metallic species, that appears to occur in abundance at Roebuck Bay; the upper surface usually has a vague bluish gloss, the prothorax, especially in the females, occasionally has a faint coppery one. The distance between the eyes of the male is slightly more than the length of the basal joint of antennæ, in the female it is about one half more; the female is usually larger than the male. It is very close to *D. solitus,* but the eyes are not quite so close together, sex for sex, the eyes of the male being about as far apart as those of the female of that species, the prothoracic punctures are somewhat different, and those of the metasternum are larger and more sharply defined on the sides; in general appearance it is like *D. striatopunctatus* but the sides of the prothorax are nonstrigose; from *D. lobicollis* it differs in being smaller, eyes of male slightly closer together, and prothoracic punctures more sharply defined in the middle;

it is also smaller than *D. quadratipennis,* much less metallic, and prothoracic punctures differ; *D. pygidialis* has much smaller punctures on head and prothorax, and eyes more widely separated.

DITROPIDUS VICARIUS sp. nov.

♂ Black, upper surface bronzy or coppery bronze, basal half of antennæ obscurely reddish. Glabrous.

Head shagreened, and with fairly dense but feeble punctures; median line vaguely impressed. Eyes rather widely separated. *Prothorax* about thrice as wide as the median length, sides strongly rounded; punctures fairly dense and rather sharply defined but small, becoming still smaller on sides. *Elytra* rather short; with rows of very small punctures, becoming larger and set in moderately deep striæ on the sides. Length (♂♀), 1·5-2 mm.

♀ Differs in the usual particulars of the eyes, legs, and abdomen.

Hab.—North Queensland (Blackburn's collection); Cairns (E. Allen). New South Wales: National Park and Ourimbah (G. E. Bryant); Sydney (A. M. Lea).—Type, *I. 10865* in South Australian Museum; cotype, *C/2320* in Queensland Museum.

Slightly narrower and more metallic than *D. rotundiformis,* prothoracic punctures decidedly smaller and those of sterna different; the intercoxal process of the prosternum has a few punctures in front, that of the mesosternum has a distinct transverse row, but the middle of the metasternum is impunctate. The prothorax could hardly be regarded as shagreened, although at first glance it appears to be so; on some of the specimens, from New South Wales, the pale joints of the antennæ are almost flavous.

DITROPIDUS VAGANS sp. nov.

♂ Black, sometimes with a slight bronzy gloss, basal half of antennæ flavous, the other infuscated, front legs partly or entirely pale, labrum and tarsi more or less obscurely diluted with red. Glabrous.

Head shagreened and with very minute punctures, median line scarcely traceable. *Prothorax* shagreened and with minute punctures. *Scutellum* narrow and distinct. Length (♂♀), 1·25-1·5 mm.

♀ Differs in the usual particulars of the eyes, legs, and abdomen.

Hab.—Northern Territory: Darwin, on Acacia flowers (G. F. Hill, No. 371). Queensland: Cairns, Charters Towers (Blackburn's collection); Brisbane (E. M. Hockings). New South Wales: Blue Mountains (Blackburn); Wentworth Falls (Simson's collection); Sydney (Dr. E. W. Ferguson and A. M. Lea); Galston, Como, and Windsor (Lea). South Australia: Port Lincoln (Blackburn and Lea); Murray Bridge (Lea); Quorn (A. H. Elston).—Type, *I. 10875* in South Australian Museum; cotype, *C/2321* in Queensland Museum.

The outlines, eyes, and punctures of sterna are as described in the preceding species, but it is less metallic, the prothorax as well as the head is shagreened, and the seriate punctures on the elytra are different; they are small, narrow, and so close together that the elytra might fairly be regarded as striated throughout; on the sides, however, the striæ are deep and well-defined as on most species of the genus. In general appearance it is somewhat like large specimens of *D. punctulum*, but is more oblong, scutellum narrower and more distinct, prothorax less opaque. although shagreened, and with more distinct punctures, and parts of front legs pale; these are sometimes entirely flavous, or at least decidedly paler than the others; occasionally the knees are infuscated and sometimes the femora are entirely dark; on one specimen from Cairns all the tibiæ are pale. The punctures on the prothorax, although minute, are sufficiently distinct on close examination, but on the head they are almost invisible.

Var. DUBIUS var. nov.

Some specimens (sexes) are structurally so close to this species that I have not ventured to give them more than a varietal name. They differ in being slightly more rounded, prothorax with scarcely visible punctures, and polished but becoming subopaque on sides; the legs are all black, or at least very obscure.

Hab.—New South Wales: Sydney (W. du Boulay and G. E. Bryant); Illawarra (Bryant); Hornsby (C. Gibbons).

DITROPIDUS BREVICOLLIS sp. nov.

♂ Black; head, antennæ (club infuscated), palpi, and legs more or less flavous. Glabrous.

Head subopaque and with scarcely visible punctures, median line very feeble. Eyes close together. *Prothorax* more than thrice as wide as the median length, sides strongly rounded; punctures minute. *Elytra* about as long as the basal width; with rows of distinct punctures, becoming smaller posteriorly, and on the sides set in deep striæ. Length (♂♀), 1·75-2 mm.

♀ Differs in being more robust, infuscation of head extended to cover clypeus, elytra less narrowed posteriorly, and abdomen foveate.

Hab.—North Queensland (Blackburn's collection); Cairns district (A. M. Lea).—Type, *I. 10866* in South Australian Museum; cotype, *C/2322* in Queensland Museum.

The eyes are closer together than in any of the preceding small species; the distance between them in the male is slightly less than the length of the basal joint of antennæ, in the female it is slightly more. From *D. vicarius* it differs also in being non-metallic, prothoracic punctures smaller and legs paler; from *D. tranquillus* in having the head opaque, and lateral striæ of elytra deeper. The legs are often entirely pale, but frequently the hind femora, and sometimes the middle ones as well, are deeply infuscated. Some specimens, from Cairns, differ in having scarcely visible prothoracic punctures, and legs more brightly flavous. A female, from Mount Tambourine, possibly belongs to the species, but differs from normal females in having slightly larger punctures on prothorax (although still small), and legs black, with the tarsi brown.

Var. ?—Twelve specimens (Northern Queensland and Bundaberg, Blackburn's collection; Cairns district, F. P. Dodd; and Kuranda, H. Hacker) are so extremely close in general appearance to this species (they even differ sexually in the colour of the head), that it seems undesirable to name them as distinct, but they certainly have the eyes more distant, those of the male being as widely separated as in the female of the typical form, and those of the female about one-third more than in its female; placing specimens side by side, the differences are at once apparent. One male has the prothorax reddish, with its middle infuscated.

DITROPIDUS OPACICEPS sp. nov.

♂ Black; clypeus, labrum, basal half of antennæ, palpi, and parts of legs, more or less obscurely flavous or reddish. Glabrous.

Head shagreened and with very minute punctures; median line feeble. Eyes rather widely separated. *Prothorax* about thrice as wide as the median length, sides strongly rounded; punctures sparse and minute. *Elytra* subquadrate; with rows of fairly distinct punctures, becoming smaller posteriorly and on the sides set in fairly deep striæ. Length, (♂♀), 1·75-2 mm.

♀ Differs in being more robust, clypeus darker than labrum, and in the usual particulars of the eyes, legs, and abdomen.

Hab.—New South Wales: Sydney, Galston, Como. Queensland: Mount Tambourine (A. M. Lea); Dalby (Mrs. F. H. Hobler); Bribie Island (H. Hacker and Lea)—Type, *I. 10930* in South Australian Museum; cotype, *C/2323* in Queensland Museum.

The outlines and general appearance are almost as in the preceding species, but the prothorax is almost—on some specimens quite—impunctate, and the distance between the eyes, sex for sex, is about twice as great; the prothorax and shagreened head readily distinguish the species from *D. tranquillus.* The legs are sometimes entirely pale, but usually the femora, or at least the hind ones, are deeply infuscated; the head could hardly be regarded as reddish, but it is not of the deep shining black of the prothorax. The prosternum and metasternum are fairly densely punctate in the middle, the metasternum is shining and sparsely punctate there. The distance between the eyes of the male is about equal to the length of the five basal joints of antennæ; in the female it is about one-fourth more. The only specimen from Mount Tambourine has darker legs than usual, and the middle of its labrum is infuscated.

GELOPTERA TETRASPILOTA Lea.

A specimen of this species, from the Queensland National Park, has an infuscate spot on the suture between the two large median spots, and these are almost connected with the sides.

EDUSA DECEMLINEATA sp. nov.

♀ Dull coppery bronze, elytra somewhat purplish, under surface more shining; labrum, basal half of antennæ, basal joints of palpi and parts of legs reddish. Densely clothed with short, ashen or white pubescence, on the elytra forming ten distinct lines.

Head shagreened and with minute punctures, distinct only on front of clypeus, median line feebly impressed and confined to basal half. Antennæ long and thin. *Prothorax* shagreened and indistinctly punctate. *Elytra* densely and finely granulate-punctate, with larger, but not confluent, punctures scattered about, and forming geminate rows. *Femora* stout, front pair acutely dentate. Length, 5·25-5·75 mm.

Hab.—New South Wales: Dorrigo (Dr. R. J. Tillyard).—Type, *C/2324* in Queensland Museum; cotype, *I. 11990* in South Australian Museum.

There are ten well-defined lines of pale pubescence on the elytra, each line bounded by geminate rows of punctures; the tip of the clypeus and a small space near each antenna are metallic green. To associate the species with others in my table[10] a new section would be required, as it could hardly be placed in F, as the elytra are conspicuously striped, and as they are without longer hairs it could not be referred to FF.

COLASPOIDES FASCICULATA sp. nov.

♂ Testaceous with a conspicuous brassy-green gloss; under surface, antennæ, palpi, and legs paler and not metallic; tips of seventh, eighth, and eleventh joints of antennæ infuscated.

Head with fairly dense but unevenly distributed punctures; with a shallow median line. Third joint of antennæ distinctly shorter than fourth. *Prothorax* about twice as wide as long, sides evenly rounded, all angles dentate; middle with rather sparse punctures, somewhat larger than those on head, but becoming larger and denser on sides. *Scutellum* impunctate. *Elytra* rather elongate, parallel-sided to beyond middle, with rather dense and fairly large punctures about base, more crowded and transversely confluent behind shoulders, much smaller and seriately arranged posteriorly. *Abdomen* shallowly depressed, with long straggling hairs, fourth segment carinated along middle, fifth irregularly impressed. *Legs* rather long, front femora stout and acutely dentate; basal joint of front and of middle tarsi large and slightly concave on lower surface; hind tibiæ rather thin and longer than the others, gently emarginate on lower surface near apex, a loose fascicle before the emargination, tip with a long curved fascicle; basal joint of hind tarsi shorter than the rest combined. Length (♂ ♀), 7-7·5 mm.

♀ Differs in being less elongate, abdomen simple, legs shorter, hind tibiæ simple, and basal joint of front and middle tarsi shorter, and much thinner.

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[10] Lea, Trans. Roy. Soc. S. Aust., 1915, p. 193.

Hab.—Queensland: Blackall Range.—Type, male and female, *C/2325* in Queensland Museum; cotype, male, in South Australian Museum.

With the general outlines and appearance of *C. tarsalis* and *C. picticornis,* with which it would be associated in my table,[11] but readily distinguished from those and all other described species by the shape and clothing of the hind tibiæ of the male; the third-sixth joints of antennæ of the male have some rather long hairs on the under surface; the tips of the antennæ of the female are missing, and only its eighth joint is infuscated.

MACROGONUS QUADRIVITTATUS Jac.

Of sixteen specimens of this species before me five have the elytra purple or blue, except that the margins and suture are narrowly flavous; on the others the blue (sometimes almost black) part of each elytron is divided into two by a flavous vitta, the vitta narrow and hardly passing the middle on some specimens, wider and almost touching the apex on others; on twelve the basal spot of the head is divided by a narrow longitudinal vitta, on the others the spot is divided into four parts, each of which is hardly more than a stain.

MACROGONUS BIFOVEICOLLIS sp. nov.

♂ Flavous, elytra dark blue or greenish blue, tarsi coppery green, second to fifth joints of antennæ metallic blue or coppery green, the following ones opaque purple, tips of mandibles blackish.

Head with a fairly deep interocular impression, connected with the base by a distinct median line; punctures sparse, irregular, and mostly small. *Prothorax* about twice as wide as long, each side with a large obtuse median tooth, front and hind angles slightly armed, between median and hind teeth a deep notch; with a large, somewhat transverse, deep fovea on each side of middle; punctures sparse and rather small, but sharply defined. *Scutellum* triangular, slightly longer than wide. *Elytra* much wider than base of prothorax; each with four irregular foveæ: two on the sides behind the shoulder, one halfway between the front one of these and the suture, the other slightly nearer the second marginal fovea than the suture; with regular rows of rather small punctures. Length (♂ ♀), 10·5-11·5 mm.

♀ Differs in having the prothorax smaller and less transverse, sides gently rounded and unarmed in middle, notch near hind angles less pronounced, disc nonfoveate, and with slightly larger punctures; elytra with lateral foveæ not traceable, and the others smaller, antennæ and legs slightly shorter and thinner, and knees and most of tibiæ dark.

Hab.—Queensland: Mount Tambourine (H. Hacker, Nos. 741 and 742, R. Illidge, and A. M. Lea).—Type, *I. 4771* in South Australian Museum; cotype, *C/2326* in Queensland Museum.

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[11] Lea, Trans. Roy. Soc. S. Aust., 1915, p. 279.

Of four males before me three have most of the abdomen infuscated, but on the other, and on four females, it is no darker than the rest of the under surface. The medio-lateral tooth on the prothorax of the male is somewhat larger but less acute than on *M. quadrivittatus*; the male is unmistakably a *Macrogonus*, but I am unable to point out how the female may be distinguished from *Macrolema.*

FAMILY EROTYLIDÆ.

LANGURIA ALBERTISI Har.

L. vulgaris Har.
L. vandepolli Fowler.
L. australis Macl.

The species of *Languria* so abundant in the Cairns district (it occurs also at Bowen, Cooktown, and Melville Island, and there are specimens in the South Australian Museum from the Madang district of New Guinea, and from Aru) has the head and prothorax red, and elytra black, with a bluish or purplish gloss; the antennæ and legs are black and the mesosternum, metasternum, and abdomen are black or deeply infuscated; this is the most common form, and has been named *vulgaris, vandepolli,* and *australis.* On 28 specimens before me the under surface is red, and the legs and antennæ partly red, agreeing with the form named *albertisi*; the differences are probably due to immaturity, as the two forms occur freely together, and there are others before me in which the normally black parts are infuscated in varying degrees. The eighth joint of the antennæ is slightly larger than the seventh, but distinctly smaller than the ninth; on the males being produced slightly to one side, it might fairly be regarded as part of the club, but on the females it evidently could not be so regarded; in *albertisi* the club was described as three-jointed, and in *vulgaris* as four-jointed, but I believe these names to belong to but one species. Blackburn has already noted *vandepolli* as a synonym of *vulgaris,* and *australis* has now to be noted as another. The size ranges 2-4·5 mm.

In Wytsman's Genera Insectorum, Fasc. 78, in which the Langurides are dealt with by Fowler, *albertisi* was referred to *Stenodastus, vulgaris* to *Cryptolanguria, vandepolli* to *Anadastus,* and *australis* was overlooked. Of the other species recorded from Australia *L. militaris* has the suture reddish (of 121 specimens of *albertisi* before me not one has the suture reddish), and *L. picea* has the head and prothorax nigropiceous (several specimens of *albertisi* have the head infuscated at base).

EPISCAPHULA OPACA Crotch.

A remarkably distinct species, the curved red mark on each shoulder is sometimes entire, but is usually broken up into two parts; on one specimen the markings are reduced to a dull spot on the shoulder, and another near apex of each elytron, the spots so dark that, to the naked eye, the upper surface appears entirely black. Specimens before me are all from Queensland: Cairns, Port Curtis, Bowen, and Bluff.

EPISCAPHULA BIFASCIATA Macl.

Macleay described the elytra of this species as "finely striate-punctate"; on the flavous fasciæ (these become reddish with age) the series of punctures, through "waterlogging," sometimes appear as fairly distinct, but they are really so small that where not waterlogged they are scarcely visible. There is a specimen of the species, from Aru, in the South Australian Museum, with the prothoracic spots smaller than usual, but in other respects agreeing well with typical specimens from Cairns.

EPISCAPHULA AUSTRALIS Boi.

E. froggatti Macl., var.

On the typical and common form of *E. australis* the elytra, as described by Boisduval, have nine black spots: three basal, three antemedian, two postmedian, and one apical; but in a fairly common variety named *froggatti* by Macleay, and figured by Kuhnt[12] the antemedian spots are combined to form a zigzag fascia. The series of punctures on some specimens appear to be large and close together, but this is due to "waterlogging"; on examining such specimens from the sides the punctures will be seen to be small and distant, although fairly sharply defined. The species occurs in Northern Territory (including Melville Island), Queensland, New South Wales, Victoria, and Tasmania; and there are also many specimens of the variety *froggatti*, in the South Australian Museum, from the Madang district of New Guinea.

EPISCAPHULA BREVICORNIS Blackb.

I am unable to distinguish this species structurally from the preceding, but the prothoracic and elytral markings are more extended, and on a somewhat different plan. On the prothorax the markings may consist of a large semi-double mediobasal blotch, and an isolated spot on each side, or they may be all conjoined: on the elytra the black markings may be continuous almost to each side, or with a projection from the red portion on each elytron, so that a large black square or oblong is isolated on each shoulder, the two large black subapical spots may be completely isolated, or conjoined across the suture.

EPISCAPHULA FLAVOFASCIATA sp. nov.

Black, with flavous or reddish-flavous markings.

Head with rather dense but very small punctures. Antennæ with third joint twice as long as fourth. *Prothorax* about twice as wide as long, sides oblique, front angles acute and each with a puncture, a vague basal depression on each side of middle; with small punctures much as on head, and a few of larger size scattered about. *Elytra* with minute punctures; sutural striæ distinct only on apical third. *Abdomen* with inconspicuous coxal lines. Length, 7-10 mm.

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[12] Kuhnt in Wytsman's Genera Insectorum, Fasc, 88, pl. iv, fig. 11.

Hab.—Queensland: Brisbane (R. Illidge); Mapleton, National Park (H. Hacker). New South Wales: Dorrigo (R. J. Tillyard and W. Heron); Richmond River (A. M. Lea).—Type, *I. 11767* in South Australian Museum; cotype, *C/2327* in Queensland Museum.

The markings are slightly variable, but on the types the prothorax is pale, with three large spots occupying the basal half, except for oblique lines between them and the sides, the median spot is more than twice the size of the others; the elytra have an irregular pale fascia at the basal third, touching neither suture nor sides, and another at the apical third, not quite touching the suture, continued around the sides and apex till the two parts are interrupted at the suture (on some specimens the fascia has a narrow extension on each side of the suture, so that two large black spots are isolated); the prosternum is flavous, and part of the abdomen obscurely diluted with red; parts of the legs are also obscurely reddish. Some of the specimens have the dark parts hardly more than castaneous, and on one such specimen the lateral spots of the prothorax appear as feeble infuscations. The punctures at the base of the head are larger than those in front, but are usually concealed by the overlapping prothorax; the elytra from some directions appear to have feeble rows of minute punctures, but from most directions the punctures are almost or quite invisible. At first glance the species appears close to *E. foveicollis*, but the head has much smaller punctures, the larger ones of the prothorax are mostly basal, and certainly not congested in the front angles, the outer spots are basal instead of median, the black basal marking of the elytra is continuous from side to side, instead of twice interrupted to the base, and the apical markings are different. It is also close to *E. bifasciata,* but with three basal dark spots on the prothorax instead of two, and the front angles less acute. In general appearance some of the specimens look like large ones of *E. brevicornis,* but may be at once distinguished by the longer third joint of antennæ.

EPISCAPHULA INCLUSA sp. nov.

Black, upper surface blackish purple or blackish blue; a large red mark on each elytron, commencing at the base, and almost touching the scutellum and shoulder, curved round so as almost to touch the side of the basal third, and then directed to the suture, which it almost touches just beyond the middle; parts of under surface and of tarsi reddish.

Head with fairly numerous, sharply defined, but not very large punctures; clypeal suture distinct but not deeply impressed. Third joint of antennæ twice the length of fourth. *Prothorax* at base more than twice as wide as the median length, sides diminishing in width to apex, front angles produced but not very acute, submarginal line deep from base to apex; punctures sparser and mostly smaller than on head, a few slightly larger ones in a feeble depression on each side of base. *Elytra* slightly dilated from shoulders to basal fourth; with regular rows of distinct, but not very large punctures, the interstices with much smaller ones. Coxal lines of *abdomen* well defined almost to apex. Length, 6-8 mm.

Hab.—Queensland (National Museum); Cairns (E. Allen and A. P. Dodd); Mapleton (H. Hacker). Type, *I. 11774* in South Australian Museum; cotypes, *C/2328* in Queensland and National Museums.

On several of the specimens the head and shoulders have a slight metallic-green gloss; to the naked eye the red markings of the elytra appear to be almost circular, they almost completely enclose a dark space about the size of the prothorax; on most of them the abdomen is paler than the rest of the under surface, and on several each segment, except the basal one, is darker at its extreme base and apex, so that the middle appears obscurely fasciate; on several the large apical joint of the palpi is conspicuously reddish. The species is wider than usual, and the elytral markings are very different from those of any previously named Australian one.

THALLIS PERPLEXA Blackb.

Numerous specimens from Cairns, Cooktown, Coen River, and Darnley Island, and one from Manumba in the Madang district of New Guinea, agree with the description of this species; which is possibly also *T. bizonata,* but that species was described as having the prothorax "very finely punctate" and the elytra as "very faintly striate-punctate"; on the specimens before me the prothoracic punctures are of moderate size and sharply defined, and the series of punctures on the elytra are larger than usual, and sharply defined even to the apex.

THALLIS MACLEAYI Blackb.

Readily distinguished from several somewhat similarly coloured species by the wide prothoracic margins, the spots close to the suture vary somewhat in intensity of colour; it occurs in Queensland (Brisbane and Bowen), Northern Territory (Darwin), and North-west Australia (Derby and Port George IV).

THALLIS INSUETA Crotch.

The four large spots, on the elytra of this species, vary somewhat in size and intensity, but are always conspicuous. The species occurs in Queensland, New South Wales, Victoria, Tasmania, and South Australia.

THALLIS AUSTRALIÆ sp. nov.

Dark castaneous brown, elytra with two reddish fasciæ. Densely clothed with dark pubescence, becoming almost golden on the fasciæ, in addition with numerous sub-erect hairs; under surface and legs with almost white pubescence.

Head sub-opaque, and with crowded but sharply defined punctures. Antennæ rather short, second to eighth joints sub-equal. *Prothorax* not twice as wide as long, sides gently rounded and slightly uneven; punctures much as on head. *Elytra* no wider than widest part of prothorax, parallel-sided to near apex; with regular rows of fairly large punctures, the interstices with numerous small ones. *Prosternum* with rather coarse punctures on sides, across middle some of them transversely confluent, intercoxal process small and almost parallel-sided. *Abdomen* with coxal lines obscured by clothing. Length, 4-5 mm.

Hab.—Queensland: Cunnamulla (H. Hardcastle); Bowen (Aug. Simson, No. 554); Dalby (Mrs. F. H. Hobler). New South Wales: Narromine (Dr. E. W. Ferguson); Condobolin (H. J. Carter from — Halligan); Belltrees (S. Jackson); Albury (A. M. Lea). South Australia: Adelaide. North-west Australia: Derby (W. D. Dodd).—Type, *I. 12006* in South Australian Museum; cotype, *C/2329* in Queensland Museum.

Similar in size to and densely pubescent like *T. erichsoni*, but without a small red spot on each side of the apex, and hence the pale markings of the elytra in two series only (constant on twenty-eight specimens), the dark median fascia considerably wider, and not zigzagged, and the punctures somewhat stronger. Of the pale fasciæ the first occupies the basal two-fifths of the elytra, except for a large subquadrate patch adjacent to the scutellum (the spot is sometimes rather feebly infuscated), the second is at the apical third, the part on each elytron is convex on its anterior margin, concave on its posterior and narrowed to the suture; the under surface and legs are somewhat paler than the head and prothorax. Two of the specimens from Derby have the dark parts black; on a few of the Queensland ones they are almost black.

THALLIS MELANCHOLICA sp. nov.

Black; legs, antennæ, and palpi more or less reddish; abdomen obscurely diluted with red. Rather densely clothed with sub-erect, rusty pubescence.

Head with dense and fairly large punctures. Antennæ with fourth joint about two-thirds the length of third, and slightly longer than fifth. *Prothorax* about once and two-thirds as wide as long, apex truncated in middle, and notched near each side, sides slightly and irregularly serrated, a rather deep line near each side; punctures slightly larger than on head, becoming smaller and denser in front. *Elytra* parallel-sided to near apex, with regular rows of fairly large punctures, becoming smaller posteriorly; interstices with numerous distinct but rather small punctures. Intercoxal process of *prosternum* moderately wide, obtusely pointed. *Abdomen* with coxal lines traceable to beyond middle of basal segment. Inner edge of front *tibiæ* minutely serrated. Length, 7-9 mm.

Hab.—Queensland: Mount Tambourine (A. M. Lea). New South Wales: Blue Mountains (Dr. E. W. Ferguson); Mount Wilson, Eden (H. J. Carter); Galston (D. Dumbrell and Lea); Sydney (J. J. Walker and Lea). Tasmania (Aug. Simson, No. 3825); Hobart (Lea).—Type, *I. 12009* in South Australian Museum; cotype, *C/2330* in Queensland Museum.

Although the derm of the majority of the specimens is of a shining black, it appears, to the naked eye, more or less dark rusty brown, owing to the pubescence; some of the specimens, however, are really rusty brown with the abdomen paler, but this is probably due to immaturity. The prosternum and outlines are much as in *T. insueta* and *T. venustula*. One of Mr. Carter's specimens was labelled as from West Australia.

EUXESTUS VULNERATUS sp. nov.

Black, a large basal patch on elytra red, muzzle and under surface castaneous, legs and antennæ flavous. Upper surface with sparse, sub-erect pubescence.

Head evenly convex; with small but sharply defined punctures; a shallow depression on each side of clypeal suture. Antennæ short, club large, slightly wider than long. *Prothorax* at base about thrice as wide as the median length, base bisinuate, apex evenly incurved to middle, margins very narrow, punctures as on head. *Elytra* with outlines continuous with those of prothorax, widest at about basal third; with rows of small punctures. *Abdomen* with coxal lines traceable to near apex of basal segment. Length, 1·75-2 mm.

Hab.—Queensland: Little Mulgrave River (H. Hacker); Cairns (C. J. Wild).—Type, *I. 12015* in South Australian Museum; cotype, *C/2331* in Queensland Museum.

A briefly elliptic, strongly convex species, very distinct by a large blood-red patch on the elytra; it covers part of the base (leaving a rather narrow strip of black on each side), then extends rather narrowly to each side, from there its margin extends obliquely towards the suture, and then is truncated across the suture itself, at the middle (on some specimens its posterior margin is rounded); the tips of the elytra are usually obscurely diluted with red, and the dark parts sometimes have a coppery gloss. On one specimen the large patch is flavous, and the apex of the elytra is conspicuously pale. The clothing of the upper surface appears to be easily abraded, as several of the specimens are now almost glabrous. The elytral punctures are all small, but are fairly distinct on the paler parts.

EUXESTUS BIVULNERATUS sp. nov.

Black, a large blood-red spot on each shoulder, legs, antennæ, palpi, and elytral epipleuræ reddish flavous. Glabrous. Length, 2-2·25 mm.

Hab.—Queensland: Mount Tambourine (A. M. Lea).—Type, *I. 11784* in South Australian Museum; cotype, *C/2342* in Queensland Museum.

Structurally extremely close to the preceding species, but slightly larger, elytral markings, which are of the same blood-red colour, extending from each side to about one-third from the suture, so as to resemble an interrupted fascia; clypeal impressions deeper and punctures smaller, especially on the prothorax and elytra. The dark parts of the upper surface, on ten specimens, are deep polished black, but on another they have a slight coppery gloss; the extreme tips of the elytra are sometimes obscurely diluted with red. The coxal lines are distinct, and enclose a plate on each side, but these are without punctures.

Var.—A specimen, from Wollongong, possibly belongs to this species, but has the elytral markings smaller and much less distinct, appearing as a rather obscure spot on each shoulder.

EUXESTUS PARKI Woll.

Black; head, tips of prothorax, elytra, and under surface (except metasternum) more or less obscurely castaneous; legs, antennæ, and palpi paler. Glabrous.

Head with rather dense and small, but sharply defined punctures; a small fovea on each side of clypeus. Antennæ short; club large, slightly wider than long. *Prothorax* not thrice as wide as the median length, base feebly bisinuate, apex almost straight, margins very narrow; punctures rather less dense, but otherwise as on head. *Elytra* with outlines continuous with those of prothorax; with feeble rows of small punctures; interstices with punctures as on prothorax. *Abdomen* with coxal lines inconspicuous. Length, 1·75-2 mm.

Hab.—Queensland: Mulgrave River (H. Hacker); Cairns (A. M. Lea).

More evenly elliptic and slightly less convex than either of the preceding species, and about one-fourth narrower in proportion; at first glance it resembles several species of *Paracymus* and other small Hydrophilidæ. On several specimens the elytra are obscurely diluted with red about the extreme tips, but on a few the red almost covers the apical third, although not sharply limited.

A specimen from New Ireland (Edgar R. Waite) is a trifle larger than Queensland specimens, but I can find no other distinctions.

DIPLOCŒLUS MAXIMUS sp. nov.

Blackish brown; legs, antennæ, and palpi obscurely reddish. Moderately clothed with short, depressed pubescence, becoming denser and paler on under surface; upper surface, in addition, with moderately long, erect, reddish setæ.

Head with fairly numerous moderate and small punctures; a deeply impressed transverse line near base. Antennæ rather short; club three-jointed, apical joint about once and one-half the length of ninth or tenth. *Prothorax* about twice as wide as long, sides evenly rounded with margin thickened, hind angles rectangular, front angles acute and produced, rest of apex straight, each side with three impressed lines, the outer continuous and within the thickened margin, the next continuous, the other shallow in front, interrupted in middle, and deep and wide at base, near base with a deeply impressed sinuous line, with a short median projection; punctures sharply defined and somewhat sparser than on head, except on margins, where they are crowded. *Elytra* almost parallel-sided to near apex; with rows of fairly large, sub-oblong punctures, becoming smaller and rounded towards suture and posteriorly; interstices each with a row of distinct punctures, and with smaller ones scattered about. Length, 8-9 mm.

Hab.—Queensland: Cairns district (H. Hacker and A. M. Lea).—Type, *I. 11787* in South Australian Museum; cotype, *C/2076* in Queensland Museum.

Close to *D. leai*, but distinctly larger, less hairy, and as a result the punctures appear more distinct and the derm shinier, with the median line of the prothorax not traceable throughout, but represented by a short impression joining the basal line. The setæ on the elytra, when viewed from behind or in front, are seen to be in regular lines, rows of longer ones on the interstices alternating with somewhat shorter ones set in the seriate punctures.

DIPLOCŒLUS SERICEUS sp. nov.

Blackish; legs, antennæ, and palpi obscurely reddish. Densely clothed with short, depressed, brownish or greyish sericeous pubescence; upper surface, in addition, with dense, fairly long, erect, reddish setæ.

Head with fairly large but partially concealed punctures, a transverse impressed line at base. Antennæ slightly passing base of prothorax; club three-jointed, apical joint almost as long as the two preceding combined. *Prothorax* about twice as wide as long, sides strongly rounded, front angles produced, rest of apex straight, with three deep somewhat curved lines on each side, a deeper and somewhat sinuous line across base; punctures minute, and more or less concealed. *Elytra* with sides gently rounded, widest at about basal third; with rows of fairly large, sub-oblong punctures, becoming much smaller and rounded near suture; interstices with minute punctures. Length, 7-7·75 mm.

Hab.—Queensland: Coen River (W. D. Dodd); Cairns district (A. M. Lea).—Type, *I. 11788* in South Australian Museum; cotype, *C/2075* in Queensland Museum.

About the size and shape of *D. leai*, but with very different clothing; the elytra have a curious mottled appearance, owing to numerous sericeous-looking patches, which alter their positions with the point of view: the arrangement of the elytral setæ is much as on the preceding species, but the pubescence is different, and the punctures are much smaller; from the prothorax, owing to the denser pubescence, they appear at first to be absent; the transverse basal line of the prothorax is also without a median projection.

Vars. ?—Two other specimens, from Cairns, probably belong to this species; they have the setæ on the upper surface much denser than on the typical form, scarcely half their length, and not at all seriate in arrangement; the pubescence has a mottled appearance, but on one of them is even denser than on the types, and on the other sparser, with the result that on one the derm appears to be sub-opaque, and on the other more polished.

DIPLOCŒLUS DILATATICOLLIS sp. nov.

Dull reddish brown or castaneous, appendages slightly paler. Densely clothed with short, depressed pubescence, denser and paler on under surface than on upper, the latter in addition with lines of short, semi-erect setæ.

Head with dense and rather small punctures; a shallow depression on each side of clypeus. Antennæ short; club three-jointed. *Prothorax* more than thrice as wide as long, base and apex subequal, front angles slightly produced, sides strongly and evenly rounded; with ten longitudinal elevations, of which those near the sides are fairly distinct and continuous, the median ones less distinct, and almost disappearing near base; punctures dense and small. *Elytra* parallel-sided to near apex; with rows of fairly large punctures, becoming smaller towards suture; interstices with small punctures. Length, 3-3·25 mm.

Hab.—Queensland: Mount Tambourine (C. J. Wild and A. M. Lea).—Type, *I. 11791* in South Australian Museum; cotype, *C/2078* in Queensland Museum.

The sides of the prothorax are dilated so that their greatest width is slightly, but distinctly, more than that of the elytra, a character that at once distinguishes the species from *D. decemlineatus,* and from *D. fasciatus* (on some specimens of the latter the elytral markings are very feeble); from *D. latus,* which has somewhat similar prothoracic sides, it is distinguished by the much smaller punctures of the entire upper surface. On several specimens there is a slight infuscation about the middle of the elytra.

FAMILY ENDOMYCHIDÆ.

IDIOPHYES BREVIS Blackb.

The type and only specimen of this species known to Blackburn is now in the British Museum, but numerous specimens before me appear to belong to the species, which at first glance seems to be a minute *Stenotarsus* (except for its shorter and entirely pale antennæ it resembles *S. pisoniæ* in miniature). In the generic diagnosis Blackburn stated "prosternum inter coxas sat angustum, postice vix productum," but later "I cannot satisfy myself as to whether its prosternum projects slightly or not at all clear of the front coxæ." Examining unset specimens it is difficult to see the end of the intercoxal process clearly, but on removing the prothorax from the hind body the intercoxal process appears rather acute, produced beyond the coxæ, with a notch in the mesosternum for its reception. Arrow states[13] that it belongs to the genus *Exysma,* of which Csiki in the Catalogue of Endomychidæ records species only from America; as the genus was first recorded from Central America by Gorham,[14] and two of the species figured[15] are very different in appearance from the Australian ones, I prefer to retain the name *Idiophyes* for the latter.

Hab.—Queensland: Brisbane (many specimens from wattle blossoms in July); Mulgrave River. New South Wales: Glenfield (many specimens from a nest of termites, *Coptotermes* sp.); Forest Reefs. South Australia: Adelaide (one specimen from a nest of the same species of *Coptotermes*); Kangaroo Island. Tasmania: Kempton.

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[13] Arrow, Trans. Ent. Soc. Lond., 1920, p. 3.

[14] Gorham, Biol. Cent. Amer., Col., vii, p. 145.

[15] L.c., pl. vii, figs. 14 and 15 (*E. orbicularis* and *E. ? tenuicornis*).

STENOTARSUS PISONIÆ sp. nov.

Reddish or castaneo-flavous, antennæ partly black or blackish. Moderately densely clothed with pale upright hair.

Head almost impunctate, with a shallow interocular impression. Antennæ short; club rather stout. *Prothorax* widely transverse, sides strongly rounded, apex much narrower than base and semicircularly emarginate, sublateral striæ deep, dilated at base; almost impunctate. *Elytra* at base slightly wider than prothorax, sides gently rounded; with regular rows of fairly large punctures, in feeble striæ; interstices with small punctures. Length, 3·5-4·5 mm.

Hab.—Queensland: Cairns district (F. P. Dodd, C. J. Wild, and A. M. Lea); Little Mulgrave and Coen Rivers (H. Hacker).—Type, *I. 12024* in South Australian Museum; cotype, *C/2336* in Queensland Museum.

Structurally close to *S. arithmeticus*, but entirely pale except for the antennæ; of these the three terminal joints appear to be always black, the four or five preceding ones vary from blackish to hardly darker than the basal ones. Some of the specimens are paler and some more densely clothed than others, probably due to better preservation. Many of the specimens from Mr. Dodd were trapped by sticky seeds of *Pisonia brunoniana.*

STENOTARSUS PICTICOLLIS sp. nov.

Reddish flavous, three spots on prothorax conjoined at base; scutellum, two large transverse spots on elytra, most of antennæ, and femora black. Length, 3·25-3·5 mm.

Hab.—Queensland: Brisbane (H. Hacker and R. Illidge).—Type, *I. 12025* in South Australian Museum; cotype, *C/2337* in Queensland Museum.

Structurally close to *S. arithmeticus*, but head and two spots on prothorax pale, the blotch on each elytron before the middle not 3-shaped, and without apical spots. It is slightly narrower than the preceding species, but the sculpture and clothing are as noted for it. The dark parts of the prothorax are a large equilateral triangle, and a spot about two-thirds of its size on each side, thus leaving a large pale subtriangular spot on each side of apex; on the elytra the spots are of somewhat irregular shape, and appear like a fascia widely interrupted in middle, and not touching the sides; three or four of the basal joints of antennæ are obscurely diluted with red, and the tibiæ and coxæ are usually deeply infuscated.

STENOTARSUS QUINQUENOTATUS sp. nov.

Red or reddish flavous; a subtriangular spot on prothorax, scutellum, four spots on elytra, antennæ (basal joints obscurely diluted with red), femora, and tibiæ black. Length, 3-3·25 mm.

Hab.—Queensland (Blackburn's collection). New South Wales: Gosford (H. J. Carter); Ourimbah (Dr. E. W. Ferguson); Wollongong, Sydney (A. M. Lea).—Type, *I. 12026* in South Australian Museum; cotype, *C/2338* in Queensland Museum.

Structurally very close to the preceding species, and with similar clothing, but elytral punctures rather less regular, the prothorax with but one dark spot, and the elytra with four placed transversely across the middle, of the latter the inner spots are oblong-elliptic and somewhat larger than the outer ones, which are circular.

FAMILY CORYLOPHIDÆ.

APHANOCEPHALUS BIMACULATUS sp. nov.

Black; elytra with two large, round, red spots before the middle; antennæ (except club), palpi, and tarsi reddish. Upper surface shining and almost glabrous, under finely pubescent.

Head with dense small punctures. Antennæ moderately long, first joint stout, ninth forming a one-jointed club. *Prothorax* at base about four times as wide as the median length, sides strongly rounded and finely margined, apex gently incurved to middle and about half the width of base: with fairly dense, minute punctures. *Elytra* with outlines continuous with those of prothorax, and with somewhat stronger margins; with fairly dense and sharply defined punctures, mostly rather small. Length, 2-2·25 mm.

Hab. Queensland: Bowen (Aug. Simson's No. 1556); Mackay (R. E. Turner).—Type, *I. 11800* in South Australian Museum; cotype, *C/2339* in Queensland Museum.

An oblong-elliptic, deep-black species, with two conspicuous red spots on elytra; of the nine specimens before me the elytral spots are alike on all, except for a slight variation in size and sharpness of definition. The punctures on the elytral epipleuræ, sides of metasternum, and basal segment of abdomen are denser and somewhat stronger than on the elytra.

APHANOCEPHALUS QUADRINOTATUS sp. nov.

Black; tarsi and four spots on elytra reddish; antennæ (except club), palpi, parts of tibiæ, and elytral epipleuræ obscurely reddish. Moderately clothed with pale, subdepressed pubescence. Length, 1·75 mm.

Hab.—Queensland: Mount Tambourine, and Cairns district (A. M. Lea).—Type, *I. 11799* in South Australian Museum; cotype, *C/2340* in Queensland Museum.

The shape and margins are as in the preceding species, but the size is smaller, punctures on elytra somewhat larger, those on the basal segment of abdomen and sides of metasternum denser but smaller than on elytra, and those on the elytral epipleuræ still smaller. The first spot on each elytron is larger than the other, curved like an inverted comma, commences near the shoulder, and terminates in the middle about one-fourth from the suture; the second one varies considerably in size and shape, and is placed at the apical third; on one specimen the spots on each elytron are conjoined, on another they are conjoined on the right elytron (so as to appear like an S) but are free on the left.

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MEMOIRS OF THE QUEENSLAND MUSEUM, VOL. VII, PART IV.

(ISSUED DECEMBER 19, 1922.)

NOTES AND ILLUSTRATIONS OF QUEENSLAND FISHES, No. 3.

BY ALLAN R. McCULLOCH ZOOLOGIST, AUSTRALIAN MUSEUM.

(By permission of the Trustees of the Australian Museum.)

(Plate XIV, fig. 1.)

A SMALL collection of fishes from Queensland waters has been submitted to me for examination by the Director of the Queensland Museum. Most of these were obtained by the trawler "Bar-ea-mul" during her investigations on the Queensland coast. They include several species not previously recognised from Australian waters.

FAMILY CLUPEIDÆ.

ILISHA HŒVENNI Bleeker.

Pellona hœvenii Bleeker, Verh. Bat. Gen. xxiv, 1852, Haring. p. 21. *Id.* Weber and Beaufort, Fish. Indo-Aust. Arch. ii, 1913, p. 86, fig. 29.

Ilisha hœvenii Bleeker, Atlas Ichth. vi, 1872, p. 117, pl. cclxix, fig. 2.

A specimen from Queensland, 163 mm. long, is the first of the genus to be recognised from Australian waters. It is similar to a smaller specimen from Amboyna, which was part of Dr. Bleeker's collection, but differs from his figure in having colourless fins and a dark ill-defined shoulder-spot.

Locality.—Between Cairns and Rockhampton, Queensland.

FAMILY MENIDÆ.

MENE MACULATA Bloch & Schneider.

Mene maculata (Bloch & Schneider) Valenciennes, Regne Anim. Illustr. Poiss., 1843, p. 139, pl. lxii, fig. 2. *Id.* Day, Fish India, 1876, p. 249, pl. 53, fig. 5.

Two specimens, 163 and 172 mm. long, were trawled between Cairns and Rockhampton, Queensland. This monotypic family has not been previously recognised from Australian waters.*

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*Editor's Note.—Day's figure of *Mene maculata* has been reproduced from "Fishes of India," pl. 53, to illustrate this new Australian record (Plate xiv, fig. 2).

FAMILY SPARIDÆ.

GENUS ARGYROPS Swainson.

Argyrops Swainson, Nat. Hist. Class. Fish, &c., ii, 1839, p. 221 (*spinifer*).

The similarity of *Argyrops* and *Pagrosomus* Gill has been noted by Jordan and Thompson (Proc. U.S. Nat. Mus. xli, 1912, p. 575). Having compared the genotypes of both genera, I find that they can only be separated by the following characters:—

a. Two rows of large teeth on each side of the upper jaw, and an inner row of much smaller ones.
  b. Dorsal spines filamentous; depth of the body greater than half its length to the hypural joint .. .. *Argyrops*
  bb. Dorsal spines not produced; depth of the body less than half its length to the hypural joint .. .. *Pagrosomus*.

ARGYROPS SPINIFER Forskal.

Sparus spinifer Forskal, Descr. Anim., 1775, p. 32. *Id.* Bleeker, Atlas Ichth. viii, 1877, p. 109, pl. 213, fig. 3.

Pagrus spinifer Day, Fish. India, 1875, p. 138, pl. xxxiii, fig. 5. *Id.* Kent, Gt. Barrier Reef, 1893, pp. 285 and 369, pl. xliv, fig. 2.

A specimen, 144 mm. long to the hypural joint, forwarded for identification by the Director of the Queensland Museum, differs from a smaller Indian example only in minor details. The second to the sixth dorsal spines are filamentous, the former reaching well beyond the hypural joint. Its general colour appears to have been pink with somewhat darker crossbars.

Locality.—The species has been recorded from Port Denison by Kent. This specimen was secured at Peel Island, Moreton Bay, Queensland.

FAMILY CHÆTODONTIDÆ.

HOLACANTHUS, CHÆTODONTOPLUS, CONSPICILLATUS Waite.

Holacanthus conspicillatus Waite, Rec. Austr. Mus. iii, 7, 1900, p. 203, pl. xxxv.

Ogilby's record of *H. conspicillatus* from Queensland (Mem. Qld. Mus. iii, 1915, p. 114) was based upon specimens properly referable to *H. personifer* McCulloch. He regarded the two as synonymous, but a comparison of five specimens of *personifer* with three of *conspicillatus* shows no intermediate forms, although the former varies considerably in its colour-marking.

A fine example, 205 mm. long, agrees in all details with Waite's types from Lord Howe Island. It was obtained near the Capricorn Group, Queensland.

FAMILY HEPATIDÆ.

ZANCLUS CANESCENS Linné.

Zanclus canescens and *Z. cornutus* (Linn) Bleeker, Atlas Ichth. ix, 1878, pp. 77-78, pl. 366, figs. 1-3.

Zanclus cornutus Macleay, Proc. Linn. Soc. N. S. Wales v, 1881, p. 548. *Id.* Stead, Proc. Linn. Soc. N. S. Wales xxxiv, 1909, p. 274.

Localities.—This widely distributed species was included in Macleay's Catalogue of Australian Fishes on the strength of an old collection specimen supposed to have been collected in Australian waters. A straggler from warmer waters was later recorded from Botany Bay, New South Wales, by Stead. A fine specimen 168 mm. long, which agrees with Bleeker's fig. 2, is in the Queensland Museum collection from near the Capricorn group, Queensland.

HEPATUS OLIVACEUS Bloch & Schneider.

Acanthurus epardi Lesson, Voy. Coquille, Zool. ii, 1830, p. 147, pl. xxvii, fig. 1.

Hepatus olivaceus (Bl. Schn.) Jordan and Evermann, Bull. U.S. Fish Comm. xxiii, i, 1905, p. 385, fig. 166.

A large specimen, 249 mm. long to the end of the middle caudal rays, agrees generally with Lesson's figure. The light shoulder-stripe extends backward to below the second dorsal ray, and is broadly margined with black.

This species has not been previously recognised from Australian waters. The specimen was obtained near the Capricorn Group, Queensland.

FAMILY CIRRHITIDÆ.

CIRRHITICHTHYS POLYACTIS Bleeker.

Cirrhitichthys polyactis Bleeker, Verh. Akad. Amsterdam xv, 1875, p. 16, and Atlas Ichth. viii, 1877, p. 147, pl. ccliv, fig. 1. *Id.* Weber, Siboga Exped. Fische, lvii, 1913, p. 259.

D. x/17; A. iii/6; P. viii/6; V. i/5; C. 15. L. lat. 50; L. tr. 4½-10. Depth (31 mm.) 2·6 in the length to the hypural joint (83); head (24) 3·4 in the same. Eye (7·5) 3·2 in the head; snout (5) 1·5, interorbital width (5·5) 1·3 in the eye.

Cheek-scales large, in 3½ rows. Lips broad, maxillary curved, reaching backward to below anterior fourth of eye. Anterior nostril with a fimbriate appendage. Preoperculum strongly denticulated, the teeth largest above the rounded angle. A small canine on each side of the premaxillaries anteriorly, and an outer row of stronger teeth, followed by a band of villiform teeth which is widest near the symphysis. Mandible with a strong canine on each side, followed by a row of conical teeth; a band of villiform teeth between the canines. A curved band of minute teeth on the vomer, and a very small band on the anterior portion of each palatine.

Scales large, cycloid, and extending onto the bases of the vertical fins. Lateral line almost straight, forming an oblique line from the shoulder to the base of the caudal fin. Dorsal spines strong, each with a free membranous filament; the second is a little longer than the last, but is shorter than the anterior dorsal rays. First dorsal ray filamentous, the others decreasing slightly in length backwards; the base of the soft dorsal fin is a trifle longer than that of the spinous portion. Second anal spine longer than the third. Simple pectoral rays abruptly longer than the branched ones, the longest reaching backward to above the third anal spine. Caudal emarginate with the outer lobes produced into filaments.

Colour.—Uniformly light-coloured after preservation, with the upper half of the spinous dorsal dark grey; the anal also is somewhat dusky.

A single specimen, 99 mm. long to the end of the median caudal rays, is probably referable to *C. polyactis.* It differs from Bleeker's figure principally in being rather more slender posteriorly.

Locality.—Near the Capricorn Group, Queensland.

FAMILY BOTHIDÆ.

PLATOPHRYS PANTHERINUS Ruppell.

Platophrys pantherinus (Ruppell) Bleeker, Atlas Ichth. vi, 1870, p. 11, pl. ccxxxiii, fig. 3. *Id.* Ogilby, Mem. Qld. Mus. ii, 1913, p. 90.

Variation.—A series of seven specimens, 38-198 mm. long, which I collected at Murray Island, exhibits considerable variation. Of the two largest specimens, which are of almost equal length, one has the elongated pectoral rays figured by Bleeker, and the orbital margins and snout are provided with several spiniform rugosities. In the other the pectoral is short and the spines are wanting.

Localities.—This species has been recorded from Darnley Island, Torres Strait, by Ogilby. Australian specimens are in the Australian Museum from Murray Island, Torres Strait, and from near Cape Flattery, North Queensland. Others are in the collection from Lord Howe Island, Funafuti, Pleasant Island, and India.

PLATOPHRYS POLYOPHTHALMUS Bleeker.

Platophrys polyophthalmus Bleeker, Ned. Tijd. Dierk. iii, 1866, p. 46, and Atlas Ichth. vi, 1870, p. 12, pl. ccxxxiv, fig. 3.

A specimen, 137 mm. long, differs from Bleeker's description and figure only in having the rostro-frontal border a little more convex. The elongate pectoral ray reaches nearly to the end of the dorsal, and there is a bony tubercle on the anterior part of the snout and one on the anterior margin of the lower orbit; both these characters are variable in *P. pantherinus*, so evidently have no value as specific characters. In all other details the specimen is as described and figured by Bleeker.

Locality.—Between Cairns and Rockhampton, Queensland. The species has not been previously recognised from Australian waters.

FAMILY TETRAODONTIDÆ.

CANTHIGASTER Swainson.

Key to the Australian species:—

a. Body without longitudinal stripes; caudal fin almost or quite plain.
  b. Body with four dark cross-bands.
    c. Anterior cross-band behind the eyes; predorsal band nearly vertical .. *valentini.*
    cc. Anterior cross-band between hinder portion of eyes; predorsal band markedly oblique .. .. *cinctus.*

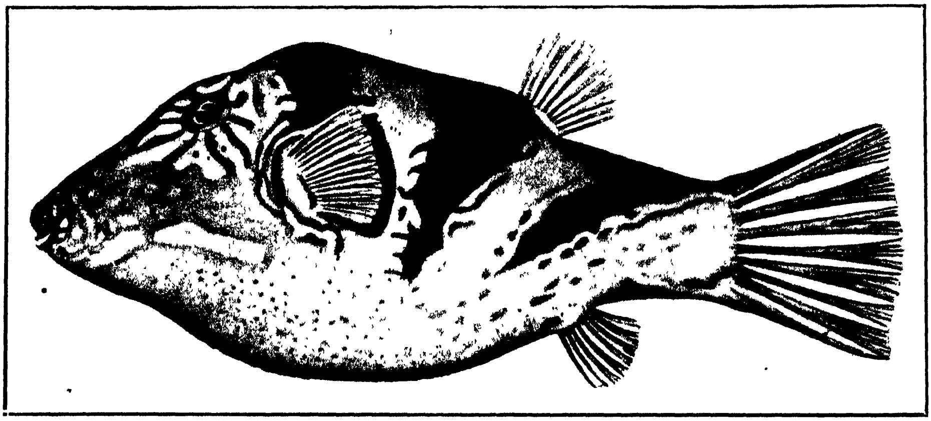

Fig. 1.—CANTHIGASTER CINCTUS (Richardson).

A. R. McCulloch, del

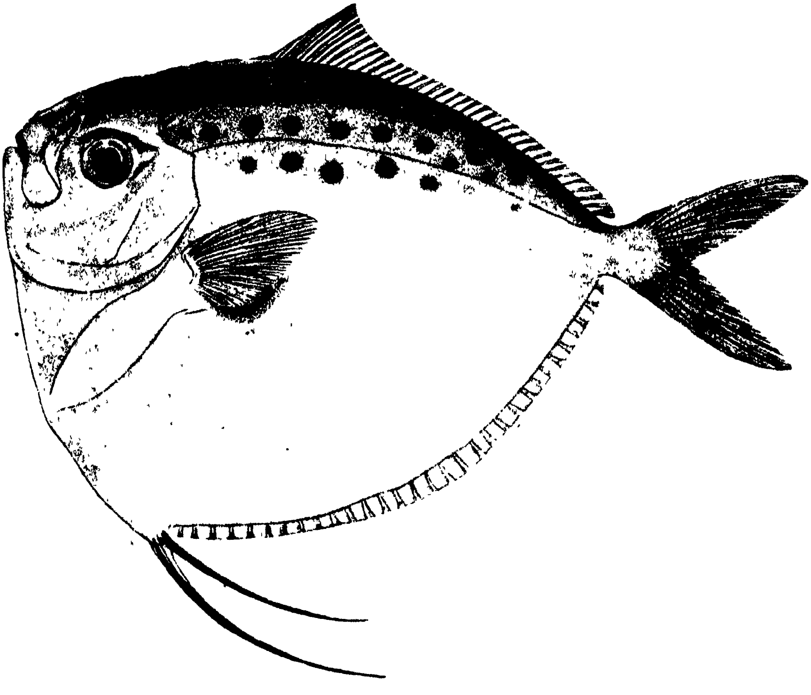

Fig. 2.—MENE MACULATA Bloch and Schneider (after Day).

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bb. Body without distinct cross-bands; a dark ocellus below origin of dorsal, indistinct in large specimens .. .. *bennetti.*

aa. Body with one, sometimes two, dark longitudinal bands from snout to tail, and extending along upper and lower margins of caudal fin.

d. Back and snout closely covered with dark lines and spots, the lower parts with or without many blue spots .. .. *callisternus.*

CANTHIGASTER CINCTUS (Richardson) Jord. & Everm.

(Pl. XIV, fig. 1.)

? *Tetrodon cinctus* Richardson, Zool. Samarang, Fishes, 1848, p. 20.

Canthigaster cinctus Jordan and Evermann, Bull U.S. Fish Comm. xxiii i, 1905, p. 433, fig. 189.

A beautifully preserved specimen, 131 mm. long, agrees with Jordan and Evermann's figure quoted above, and differs from *C. valentini* in the disposition of its dark cross-bands. It is from near the Capricorn Group, Queensland.

CANTHIGASTER VALENTINI Bleeker.

Tropidichthys valentini Bleeker, Nat. Tijd. Ned. Ind. iv, 1853, p. 130.

Canthogaster valentyni Bleeker, Atlas Ichth. v, 1865, p. 80, pl. ccviii, fig. 1.

Canthigaster valentini McCulloch, Proc. Linn. Soc. N. S. Wales xxxvi-3, 1911, p. 423.

Two specimens, collected at Murray Island, Torres Strait, were recorded by McCulloch.

CANTHIGASTER BENNETTI Bleeker.

Tetrodon ocellatus Bennett, Fish Ceylon, 1828-30, pl. xxi (name preoccupied).

Tropidichthys bennetti Bleeker, Nat. Tijd. Ned. Ind. vi, 1854, p. 504.

Canthogaster ocellatus Bleeker, Atlas Ichth. v, 1865, p. 80, pl. ccxiv, fig. 5.

Canthigaster bennetti McCulloch, Proc. Linn. Soc. N. S. Wales xxxvi, 1911, p. 305.

Several specimens from Murray Island, Torres Strait, were recorded by McCulloch.

CANTHIGASTER CALLISTERNUS Ogilby.

Tetrodon callisternus Ogilby, Mem. Aust. Mus. ii, 1889, p. 74, pl. iii, fig. 5.

Eumycterias callisternus Ogilby, Mem. Qld. Mus. i, 1912, p. 62.

Recorded from Southport, Queensland, by Ogilby. Several specimens of various sizes are in the Australian Museum from Lord Howe Island.

AN ICHTHYOSAURIAN SKULL FROM QUEENSLAND.

BY HEBER A. LONGMAN, F.L.S., DIRECTOR, QUEENSLAND MUSEUM.

(Plates XV and XVI and Text-figures 1 and 2.)

The remains which are the subject of this paper were found at Galah Creek, about twelve miles from Hughenden, in the Rolling Downs formation (Lower Cretaceous) of Western Queensland, and were collected, forwarded, and kindly donated to the Queensland Museum by Mr. S. Dunn and Mr. William Elliott in May, 1914. It is my pleasant duty heartily to thank these gentlemen for their enthusiastic work in securing this large and valuable specimen for our collections.

MATERIAL.—As will be seen from the profile view, illustrated in Plate XV., this large skull is in six pieces. The extreme end of the rostrum is missing, but, judging from the structure of the anterior part preserved, only a small portion would be needed to complete the skull. Gilmore[1] has pointed out how frequently the extreme anterior segment is missing in Ichthyosaurs, and how fractures are caused by the cracking of specimens when enclosed in an elongate concretionary mass.

The skull is massive, with a maximum length (mandibular) of 1,026 mm., and a maximum width (articular area of mandible) of 395 mm. It is evident that great changes have taken place since it came to rest. As a result of tremendous vertical pressure, the whole of the teeth, with the exception of broken roots, have been forced from the continuous dental grooves, characteristic of *Ichthyosaurus*, and the premaxillary and mandibular rami are now in juxtaposition. Fortunately, many of the teeth have been preserved, mostly as fragments, on the lateral and lower surfaces of the jaw. In the posterior part of the skull there are still greater evidences of changes under intense pressure. On the left-hand side the orbit has been crushed down and its original contours are not distinguishable. As a result of this lateral torsion, the mandible has been somewhat displaced to the right. The supratemporal fossæ are preserved in fairly symmetrical condition. Great difficulty has been experienced in studying some of the component parts. The distortion of the skull is accompanied by a very close investiture of the remains by a fine hard limestone matrix, which in places is almost indistinguishable from the actual fossil. The matrix involving *Cratochelone berneyi*,[2] described by the author in 1915 from the same district, was very similar in texture. This investing material evidently penetrated the skull after the decay of cartilage, cementing the disrupted elements together.

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[1] C. W. Gilmore, Mem. Carnegie Mus., Pitts., II, 1905, p. 80.

[2] H. A. Longman, Mem. Qld. Mus., III, 1915, p. 25.

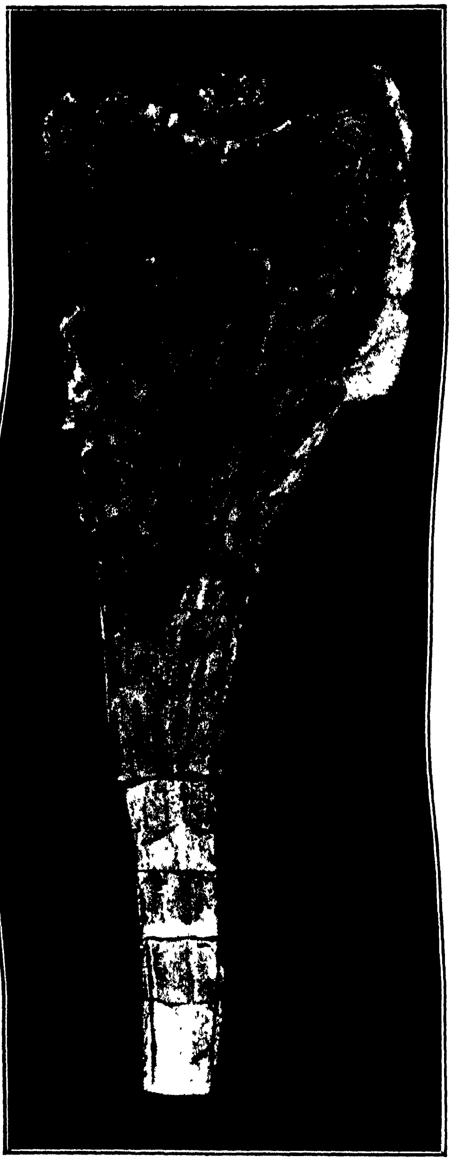

Fig. 1.—Skull of Ichthyosaurus australis. Superior view.

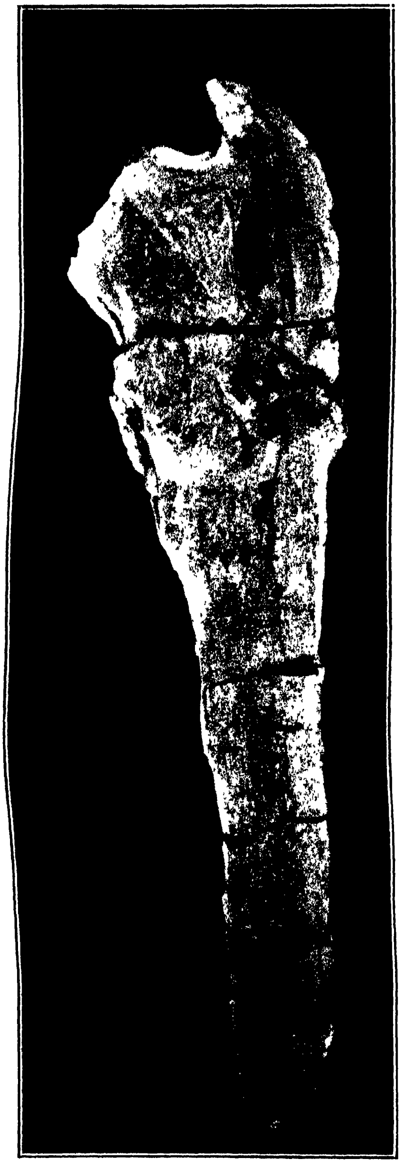

Fig. 2.—Skull of Ichthyosaurus australis. Lateral view. Approximately one-seventh natural size.

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On the upper part of the skull the elongate premaxillæ can be traced back for a distance of 615 mm. to the narial openings. Between these two bones in the superior surface is a well-marked symphysial groove. The nasals are exposed from beneath the premaxillæ at about the anterior third of the length of the skull, and at first are on a lower plane than the hemispherical superior borders of the diverging premaxillæ, forming a triangular recess. Further back there is a secondary triangular depression, the borders of which are parallel to the anterior recess, but this is entirely internasal. Lateral divisions of the nasals extend outwards beyond the frontals towards the superior border of the orbits. Sutures with post frontals cannot be traced.

The external narial openings can be seen on both sides, but they are distorted. A semicircular raised border is present behind the openings. Incomplete maxillæ are present, but the sutures between them and the lachrymal bones and the jugals cannot be positively traced on either side.

In the region of the frontals a remarkable rectangular raised process was present in the undisturbed fossil. On careful development this proved to be mainly matrix closely investing a troughlike depression, with raised lateral borders, as may be seen in Plate XV. At first this was thought to be a veritable raised bony border surrounding the pineal foramen, and suggesting an unusual development of "the third eye," but the true foramen is apparently situated in a more posterior position. This closely adpressed structure consists of two parallel bars, thinly joined anteriorly; the bars are 90 mm. in length and are symmetrically disposed at a distance of 10 mm. from the median line. If this structure is actually *in situ*, which seems unlikely, it would demand generic recognition. The frontal bones evidently do not extend far beyond the area of this structure. In view of the partial disorganization of the specimen, possibly associated with an attack from other predaceous or scavenging monsters of the period, it is suggested that this curious structure represents an inverted cranial element. It cannot, however, be allocated with any of the bones, the contours of which are so clearly demonstrated by Sollas' classic sections,[3] and possibly represents hyobranchial elements. And it is, of course, possible that further material will demonstrate characters which will warrant the establishment of a new genus for this large Australian Ichthyosaur. The prominent ridges, which are present in the parietal region and on the nasal bones, appear to be distinctive features. From the occipital border of the parietal region a convex median ridge extends anteriorly, and this is accentuated by the presence on each side of elongate valleys, the lateral sides of which curve upwards to form the borders of the supratemporal fossæ. At the anterior termination of the median ridge there is a cavity which could not be traced into the internal tables of the skull, but which probably represents a disrupted pineal foramen. This is nearly in line with the anterior borders of the supratemporal fossæ, and is thus in the usual position for the foramen.

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[3] W. J. Sollas, Phil. Trans. Roy. Soc., B, 208, 1916, pp. 66-126.

In the temporal region the anterior horn of the squamosal extends to the middle of the large oval fossæ, articulating with the postorbital. The fossæ are fairly symmetrical, approximately 120 mm. in length, with a breadth of 75 mm.

On the right-hand side the orbit is well preserved, except for its posterior border. The cavity has been largely set free from the cement-like matrix, which here contained molluscan fragments. It was carefully excavated in the hope that the characteristic sclerotic plates, possibly driven inwards, might be exposed, but these have entirely disappeared. It is evident that the orbit was the characteristic oval. Its vertical diameter at the periphery is 110 mm. Beneath the orbit, portions of the jugal can be seen, but the full extent of the zygomatic arch with its sutures cannot be outlined. The jugal appears first as a raised process near the midline of the anterior border of the orbit and then curves down to form its lower edge.

A large supratemporal bone is present on the left-hand side, and its superior margin junctions with the lateral border of the squamoso-postorbital arcade. Much controversy has taken place over the "additional temporal bone," as S. W. Williston called it in the Ichthyosaurs, and the author has followed the nomenclature of Lydekker,[4] Sollas (*loc. cit.*), Gilmore, and Andrews in calling it supratemporal. Williston considered the inner bone of this "Diapsid" group the tabular and the outer the squamosal,[5] but in view of Watson's demonstrations[6] it is surely better to reserve the name "squamosal" for the more constant element. Perhaps the laterotemporal or "sclerodermal plate," as Owen called it, is really a separated division of the quadratojugal.

The quadratojugal is present, and its posterior portion is visible in the occipital region, where it forms the inferolateral border of the vacuity presented by the curved shaft of the quadrate. Its sutures with the supratemporal are obscure.

BASI-OCCIPITAL.—The stout symmetrically convex condyle extends backwards beyond the pterygoids for a distance of 33 mm.; the tranverse diameter is 74 mm., vertical diameter 64.

BASIS CRANII.—The suture between the basioccipital and the basisphenoid can be traced, giving a length of 60 mm. to the former bone. The basisphenoid is about 75 mm. in length, and forms with the posterior element a rectangular rostrum for the support of the pterygoids. The basisphenoid has a visible width of about 60, whilst the basioccipital is about 40 mm. Near the posterior margin of the basisphenoid the opening of the single canal for the carotic arteries can be clearly seen; this foramen is circular and has a diameter of 10 mm. In the median line of the interpterygoid vacuities the splint-like parasphenoid may be seen, but this has been only partially freed from the matrix, compared with which it is very friable. This bone evidently increases in thickness towards its upper surface and is triangular in section. It can be traced anteriorly for a distance of 220 mm., where it is

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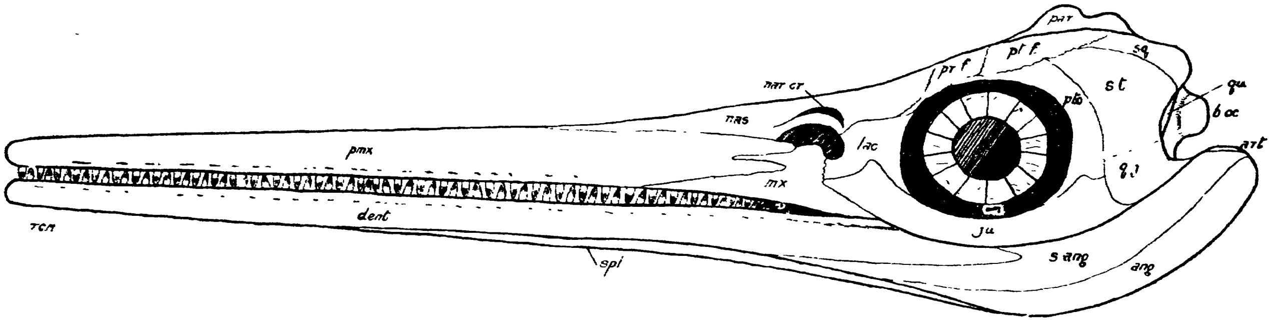
[4] R. Lydekker, Catal. Foss. Rept. Brit. Mus., Part 11, 1889, p. 3.

[5] S. W. Williston, Phylogeny and Classification of Reptiles (Journ. Geo XXV), 1917, p. 416.

[6] D. M. S. Watson, Ann. Mag. Nat. Hist. (8) XIV, 1914, pp. 84-95.



Text-figure 1.—Reconstruction of the skull of *Ichthyosaurus australis*. Approximately one-seventh natural size. *Ang.*, **angular**; *art.*, articular (showing post-articular surface); *b. oc.*, basioccipital; *dent.*, dentary; *ju.*, jugal; *lac.*, **lachrymal**; *mx.*, maxilla; *nar. cr.*, narial crest; *nas.*, nasal; *par.*, parietal; *pmx.*, premaxilla; *pr.f.* **prefrontal**; *pt.f.*, **postfrontal**; *pt.o.*, postorbital; *q.j.*, quadratojugal; *qu.*, quadrate; *s. ang.*, surangular; *sq.*, squamosal; *sp.*, splenial; *s.t.*, **supratemporal**.

lost in matrix. The pterygoids provide the greater part of the base of the posterior moiety of the skull. On the left-hand side the pterygoid is in juxtaposition with and somewhat overlaps, owing to displacement, the basioccipital and basisphenoid. The right pterygoid has been tilted below the plane of the flanges presented by the axial bones. From the basioccipital to the lateral border the pterygoid attains a maximum breadth of 110 mm.

Owing to the presence of superimposed hyoid rods, and a brecciated mass of broken teeth and matrix containing associated fossils, the central portion of the lower surface of the fossil is obscured. The extent of the interpterygoid vacuities cannot be gauged, but, judging from the converging inner margins of the bones, the contours in this area are similar to the skull of *Ichthyosaurus longifrons* as figured by Owen.[7] The palatine elements appear to be displaced and are not visible in the same plane.

POSTERIOR REGION.—The contours of the superior border of the occipital region, formed by the parietals and processes from the squamosals, are quite continuous, being convex in the median area and then sloping to lateral concavities. Viewed from above, the postero-external borders of the squamosal are seen to curve symmetrically backwards, and, although the occiput is somewhat disrupted, the contours are quite elegant. The inner process of the squamosal unites in an oblique suture with the lateral arm of the parietal near the median line of the supratemporal fossa.

A large quadrate is present on each side, but owing to mandibular pressure these bones have been forced somewhat out of position.

Above the region of the foramen magnum, only small fragments are visible in the matrix of elements which correspond to the superior occipitalia, which have apparently been forced inwards. Possibly these are paired extensions of the supraoccipital which form part of the lateral borders of the foramen magnum.

The opisthotics are in place on each side, and junction with the basioccipital, the "stapes," and the squamosal.

SUGGESTIONS FOR A RE-INTERPRETATION OF THE SO-CALLED STAPES—

Next to the quadrate, the largest bone in the occipital region is the element called "stapes" by Sollas and Andrews. This acts as a strong lateral buttress of the basioccipital, and lies above the posterior flange of the pterygoid. It has an expanded facet for junction with the basioccipital, with an adjoining superior surface for association with the opisthotic. Cope,[8] who was the first to name this bone, did so with diffidence, and figured it as distinctly separated from the basioccipital, whereas modern authors rightly show it as a buttress supporting the rostrum of the condyle. Owen[9] named it the paroccipital, but apparently only

[7] Owen, Liassic Reptilia, Mon. Pal. Soc., 1881, Pl. XXV.

[8] Cope, Proc. Amer. Assn. Ad. Sc., 1871, p. 199, fig. 2.

[9] Owen, Mon. *loc. cit.*, p. 94.

dealt with two pairs of occipital elements below the supraoccipital. C. W. Andrews notes that this bone (stapes) "seems to have lost its auditory function,"[10] and it is obvious that this so-called stapes cannot be associated with the fenestra ovalis, as Cope supposed. The stapes is usually regarded as the homologue of the hyomandibulare of fishes, and a large stapes is recorded for the Cotylosauria. Case figures the stapes of Dimetrodon,[11] a bone which in this and allied Permian reptiles is regarded by Broom[12] as the tympanic. The writer is unable to find, however, a parallel in literature to the interpretation of this buttress bone of the Ichthyosaurs as a stapes.

The columella auris of modern reptiles, the proximal end of which is presumably homologous with the stapes, is always placed antero-laterally to the basioccipital, and is quite distinct in position from this buttress bone.

The writer suggests that these lower lateral elements in the occipital region, the so-called stapes, should be interpreted as inferior divisions of the exoccipitals. That the upper elements are true exoccipitals seems to be demonstrated by the position of the foramen for the post-auditory nerves, as clearly shown in Andrews's illustrations (*loc. cit.*), and also by their relations to the foramen magnum. The unusual extension of the intermediate lateral occipitalia, the opisthotics, to the basioccipital, to which they also act as buttress bones, has probably brought about a division of the exoccipitals into upper and lower portions.

These lower lateral elements may thus be interpretated as inferior divisions of the exoccipitals. This change in nomenclature, giving the exoccipitals a ventral extension, appears to be generally supported by the position of the occipital elements in the Permian Tetrapoda studied by von Huene[13] and by R. Broom[14], and in the Stegocephalia illustrated by C. Wiman.[15] It is in consonance with the general arrangement of the bones in modern reptiles, where the exoccipitals are usually the lower lateral elements in juxtaposition with the basioccipital, the opisthotics uniting with them antero-superiorly in adult life (distinct in Chelonians); these relationships of the two elements are shown by Parker's studies of the development of the skull in the snake and the lizard.[16] It is not at variance with Howes and Swinnerton's interpretation of the development of the skull of *Sphenodon*.[17] It agrees also with the positions given by Kingsley in his diagram of the schematic vertebrate skull.[18] Huxley wrote that but for its large size he would have regarded the adjoining bone, now generally accepted as the opisthotic, as the stapes.[19]

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[10] C. W. Andrews, Marine Rept. Oxford Clay, Brit. Mus., 1910, p. 11.

[11] E. C. Case, Bull. Amer. Mus. Nat. Hist., XXVIII, 1910, p. 190.

[12] R. Broom, Bull. Amer. Mus. Nat. Hist., XXVIII, 1910, p. 223.

[13] von Huene, Bull. Amer. Mus. Nat. Hist., XXXII, 1913, pp. 315-386.

[14] R. Broom, Bull. Amer. Mus. Nat. Hist. XXXII, 1913, p. 563, etc.

[15] C. Wiman, Bull. Geol. Inst. Upsala, XIII, 1915, Pt. 1.

[16] W. K. Parker, Phil. Trans. Roy. Soc., Vols. 169 and 170, 1878-79.

[17] Howes and Swinnerton, Trans. Zool. Soc., XVI, 1901.

[18] Kingsley, Outlines Comp. Anat. Vert., 2nd edit., p. 74.

[19] Huxley, Anatomy of Vertebrated Animals, 1871, p. 211.

The opisthotic or paroccipital very rarely appears to meet the basioccipital below the exoccipitals in other reptiles, although the relations between these elements are variable. The writer has diffidence in using terms that are not accepted by leading authorities, but the occipital region of the Ichthyosaurs provides material for several interpretations, and the use of exoccipital for the lower element seems to solve the difficulty of a most anomalous " stapes."

In the modern cetaceans the stapes is frequently reduced to a small conical plug, and, judging from analogy, the auditory functions of the Ichthyosaurs would not have been greatly utilised. Possibly the real stapes is the " long slender process " demonstrated in Section 494 of the very fine series in Sollas' great work (*loc. cit.*).

The stapes is often missing in fossils. The elaborate studies by D. M. S. Watson of the position of the fenestra ovalis in Therapsids, *Seymouria*, etc. (P.Z.S., 1914, and 1919) have an important bearing here, but the posterior aspect of the occipitalia in our specimen presents no evidence on this point.

The massive architecture of the occipital region was evidently associated with the attachment of powerful nuchal muscles. Perhaps a specialist will one day work out details of the probable musculature of the Ichthyosaurs on similar lines to the recent studies by Gregory and Camp on *Cynognathus*.[20]

LOWER JAW.—On the left hand side the lower jaw is practically complete, except for the missing anterior segment and a small portion of the angulare. The dentary is very elongated and is no less than 875 mm. in maximum length. Parallel with the alveolar border, and situated about 20 mm. below it, is a groove which is shallow anteriorly, but then deepens, giving the characteristic conjoined gun-barrel effect of the Ichthyosaurian rostrum. The posterior process of the dentary, which overlaps the surangulare, runs back to below the mid-region of the supratemporal fossa. Here the semi-spherical contours (in section) of the upper rod, or gun-barrel-like process, sink into the same plane as the surangulare and angulare.

The left angulare is not quite complete at its posterior end, and here its outer contours have been disturbed. It is a longer and more massive bone than the surangulare, but just at the termination of the dentary the two posterior elements are of equal depth. In this region the arrangement of the bones is very similar to the outer view given by C. W. Andrews for *Ophthalmosaurus* in Text-fig. 20 (*loc. cit.*), except that the angulare is distinctly extended to form the posterior portion of the mandible. Strong depressor muscles were evidently attached here, working with short leverage in association with the powerful levators placed in front of the articulation. Sollas points out that the levator muscles originating in the temporal region, inserted on the lower jaw, acting as levers of the third order, were "admirably adapted for snapping; and the Ichthyosaurus, from all that we know of it, must have obtained its food by seizing fish ' upon the wing.' "

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[20] Gregory and Camp, Bull. Amer. Mus. Nat. Hist. XXXVIII, 1918, pp. 447-563.

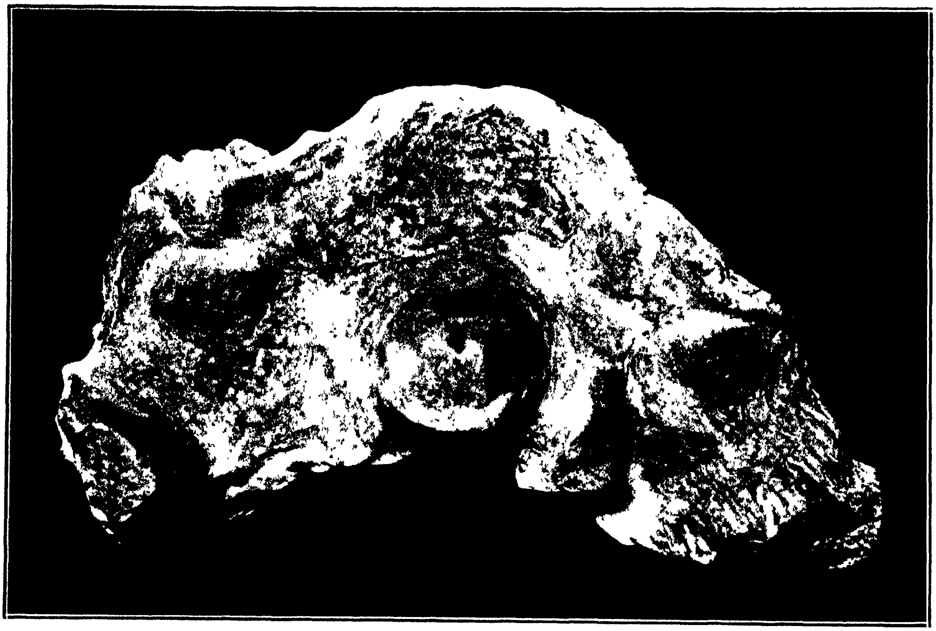


Fig. 1.—Skull of Ichthyosaurus australis. Posterior view. Approximately one third natural size.

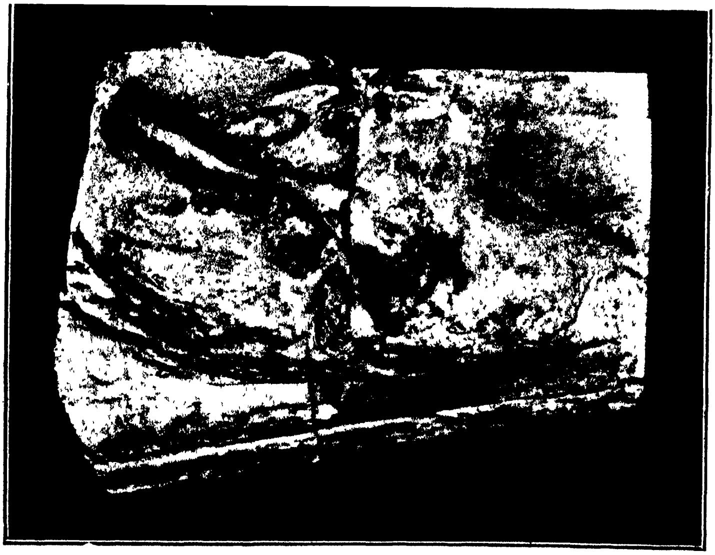
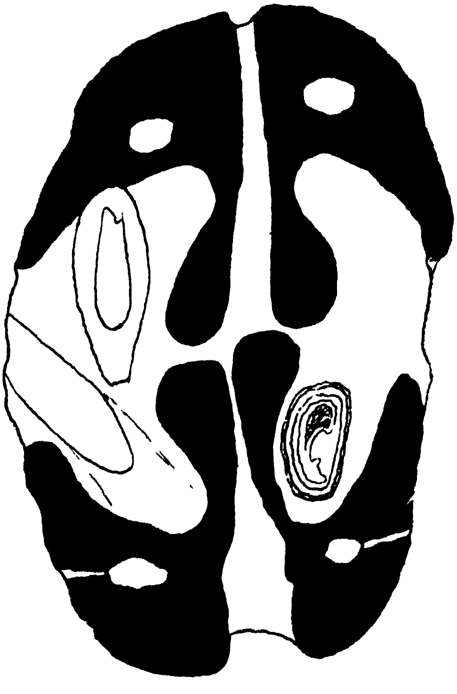


Fig. 2.—Anterior section of rostrum, Ichthyosaurus australis, showing disrupted teeth. Approximately one-half natural size

The articular is present and evidently rests in its original position on the angular, with its outer lateral surface adjoining the surangulare. Only the post-articular area has been freed from the matrix, and this is obliquely set on the angular, with its upper surface turned towards the supraoccipital region.

The splenials first appear on the lower surface of the mandible at a distance of one-fifth of the length of the skull, this being greatly in advance of the divergence of the premaxillæ to expose the nasals in the upper jaw. They are visible for a considerable distance on the inferolateral margin. The relative proportions of these elements are shown in Text-fig. 1. The condition of the fossil does not present evidence for the description of the inner side of the mandible.



Text-figure 2.— Section showing premaxillary and dentary elements, with teeth fragments, in the polished surface of anterior segment of rostrum, *Ichthyosaurus australis* (natural size).

The internal structure of the anterior end of the rostrum has been demonstrated by polishing, and is shown in Text-fig. 2. The alveolar groove has a well-developed inner wall with an expanded margin. On each side of the lower jaw the section exposes a foramen leading from the nutrient groove to the vascular canal. This section is entirely from premaxillary and dentary elements.

TEETH.—Unfortunately there are no complete teeth *in situ* but, as previously ated, remains have been preserved adhering to external surfaces. Some of these which were cemented to the lateral surface of the rostrum are shown in Plate XVI. Between the mandibular rami about the mid-region of the skull there is a brecciated mass formed mainly of broken teeth, although containing other fossils. The teeth are subcylindrical, and there are no anterior or posterior carinæ. They are about 55 mm. in length, with a maximum diameter of 18 mm. After counting the number of grooves on exposed contours, it is considered that a perfect specimen would have about thirty longitudinal striæ. The teeth are evenly conical, and there is no marked tumidity at the alveolar border. Judging from the numerous fragments, they were fairly isodont, but some of the roots are decidedly compressed. They are somewhat larger than those in the type specimen in this Museum of *Ichthyosaurus marathonensis*, Etheridge *fil.* It is estimated that about forty teeth were present in each alveolar groove.

On the posterior third of the lower jaw, and cemented thereto, may be seen remains of the stout, cylindrical "hyoid rods" (to use Sollas' term). These are 15 mm. in diameter, and attain a length of 250 mm. They also overlap the lateral surface on the left-hand side, as may be seen in Plate XV.

Unfortunately no other remains were found in association with the skull, and although this Museum contains several specimens of vertebræ, a paddle, and a few other fragments from Western Queensland Cretaceous formations, it would be unwise to describe these in conjunction with the present material.

CLASSIFICATION.—The Ichthyosauria have been divided into four families :— *Mixosauridæ*, *Ichthyosauridæ*, *Baptanodontidæ*, and *Shastasauridæ*, the last-named being added by Merriam in 1902.[21] The diagnostic characters of the majority of recent genera are not founded on cranial characters. It is evident, however, that our fossil has no affinity, generically, with the *Ophthalmosaurus-Baptanodon* group (Jurassic), which is characterised by an enormous eye and a very reduced dentition. Neither is it related to *Mixosaurus* (Triassic), in which the teeth are not set in a continuous groove. In the occipital and mandibular regions and in the basis cranii the elements in the Queensland skull approximate to the *Ichthyosaurus* type, but apparently unique characteristics are present on the superior surface of the skull.

Two species of *Ichthyosaurus* have been described from fragments obtained in the Cretaceous deposits of Western Queensland. In 1867, McCoy briefly described *Ichthyosaurus australis*[22] and in 1869 supplied some additional details.[23] His material consisted of two portions of the skull, teeth, some dorsal vertebræ, paddles, and a humerus, radius, and ulna, and his short description was not illustrated. In 1888, Etheridge *fil.* described *Ichthyosaurus marathonensis*[24] from a maxillary and dentary section ten inches in length, which is now in the Queensland Museum. In 1892

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[21] Merriam, Bull. Dep. Geol., Univ. Calif., Vol. III, 1902, p. 87.

[22] McCoy, Ann. Mag. Nat. Hist., XIX, 1867, p. 355 ; XX, p. 196.

[23] McCoy, Trans. & Proc. Roy. Soc. Vic. IX, 1869, pp. 77-78.

[24] Etheridge, Pr. Linn. Soc. N.S.W., III, 1888, p. 405, Pl. VII.

Etheridge gave details of these species with actual localities and records of other fragments, and queried the identity of the two species.[25] In 1897 he made a further note on precaudal vertebra as being *Ichthyosaurus australis*.[26] Direct comparison between the type fragment of *I. marathonensis* and the present skull shows too great a similarity, so far as this region is concerned, to warrant the introduction of a new specific name; indeed the type fragment, except for the slightly smaller teeth, could almost be placed as a section of the rostrum of our fairly complete skull without doing violence to its contours.

Unfortunately, McCoy's material was too inadequately described to permit Etheridge to make a satisfactory comparison. The teeth were compared with those of *I. campylodon*, and the antero-posterior diameter of the orbit was given as five and a-half inches. Chapman figured a cranial fragment and a paddle of the type material in his useful handbook.[27] McCoy's species has priority, and in the present state of our knowledge it is deemed inadvisable to ignore it in connection with the Queensland skull, with which its sectional dimensions fairly agree. Our specimen has therefore been catalogued as *Ichthyosaurus australis* McCoy.

I. marathonensis is regarded as a synonym. There is evidence, however, of another species occurring in Queensland, distinguished by smaller teeth, but this awaits further material before elucidation.

The relationships of the Ichthyosaurs have been the subject of recent research by such prominent authorities as Sollas, Andrews, Williston, Merriam, van Huene, and Broom, and partly centre around the homologies of the temporal elements. It is now generally agreed that the Ichthyosaurs are descended from the primitive Permian Carboniferous Cotylosaurs. This primitive reptilian group exhibits ordinal characters which, in the words of W. K. Gregory, are "structurally ancestral to all the higher vertebrates."[28] This fascinating problem, with its wealth of literature illustrating very numerous forms, is too intricate to be dealt with here. From the standpoint of popular interest it may be mentioned, however, that an outstanding characteristic of most Ichthyosaurs, an elongated rostrum, is a common feature in very diverse vertebrates. Among the large present-day reptiles the prolonged snout of the gavials is remarkable. There are commonplace examples amongst birds and fishes. The Ziphoid Cetaceans, such as species of *Mesoplodon*, are mammalian types which rival the Ichthyosaurs in the extreme development of the anterior elements. This elongated rostrum is evidently a characteristic associated with special feeding habits, and is a demonstration of the mobility of vertebrate structure. Fortunately the specialised forms in these groups are not isolated, in this respect, but can now be studied in conjunction with allied genera and families which are more conformable to the usual type of skull. The various developments of the rostrum in vertebrate crania provide abundant material to illustrate remarkable processes of evolution.

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[25] Jack & Etheridge, Geology and Palæontology of Queensland, 1892, pp. 505-508.

[26] Etheridge, Rec. Austr. Mus., III, 1897, pp. 66-68.

[27] Chapman, Australasian Fossils, 1914, fig. 133, p. 277.

[28] W. K. Gregory, "Origin and Evolution of Human Dentition," Jr. Dent. Res., II, 1920, p. 100.

Matrix.—Professor H. C. Richards, Hon. Petrologist and Mineralogist on our staff, kindly contributes the following note on the matrix:—"Stone-coloured, fine-grained, homogeneous calcareous mudstone. There is sufficient calcareous material to cause rapid effervescence with dilute hydrochloric acid, and a residual mass of cream-coloured clay material is left behind."

Associated Fossils.—An almost-complete shark's tooth is present in the brecciated mass between the mandibular rami, and is probably an anterior tooth of *Lamna appendiculata* Agassiz.

Several specimens of the common bivalve, *Aucella hughendenensis* Etheridge were taken from the matrix, including fairly complete valves from the orbits. Two specimens of a small gasteropod were found, and Mr. W. H. Bryan, M.Sc., Hon. Palæontologist on our staff, has identified these as *Turritella* (?) *microlinea*, a rare shell which was named by Etheridge in 1920.[29]

LIST OF PLATES.

Plate XV.

Figure 1.—Skull of *Ichthyosaurus australis*; superior view. ~~Approximately one-third natural size.~~

Figure 2.—Skull of *Ichthyosaurus australis*; lateral view. Approximately one-seventh natural size.

Plate XVI.

Figure 1.—Skull of *Ichthyosaurus australis*; posterior view.

Figure 2.—Anterior section of rostrum, showing disrupted teeth. Approximately one-half natural size.

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[29] R. Etheridge, Publ. No. 269, Qld. Geol. Sur., 1920, p. 13.

AUSTRALIAN BEES IN THE QUEENSLAND MUSEUM.

By T. D. A. Cockerell, University of Colorado.

PARASPHECODES Smith.

This genus, which is very closely allied to *Halictus*, consists of a large number of species, nearly all apparently with very restricted distribution. They may be oligotropic on particular flowers, but at present we know hardly anything of their habits. Smith described a number of species, giving them names which are anagrams of *Halictus*. I have examined the types of all of these, but to my surprise I fail to find them in the various Australian collections coming to hand in recent years. The genus is especially south-eastern, with no less than twenty-one species described from Tasmania, and nineteen from Victoria, one of the latter extending to Tasmania. Two of the Victoria species go north to Queensland, which has eight species and a subspecies of a Victoria one not known elsewhere. From South Australia five species have been described, but from West Australia only two, and N.W. Australia one. Two are only known from N.S. Wales. The series now before me from the Queensland Museum (to which the types will be returned) adds a number of species, separable from one another as follows :—

	Clypeus partly yellow ; males	1.
	Clypeus all black ; females	4.
1.	Abdomen entirely black ; mesothorax glaucous	*cervicalis* Cockerell.
	Abdomen partly or wholly red	2.
2.	Abdomen wholly chestnut-red ; tubercles entirely black	*solis* n. sp.
	Abdomen partly black	3.
3.	Tegulæ light ferruginous	*longmani* n. sp.
	Tegulæ black	*subrussatus* n. sp.
4.	Abdomen entirely black	5.
	Abdomen at least partly red	6.
5.	Area of metathorax short, distinctly plicate, with a prominent raised rim	*cervicalis* Cockerell.
	Area of metathorax long, feebly sculptured, subemarginate at apex, without a raised rim	*paramelænus* n. sp.
6.	Flagellum red beneath	*lichatinus* n. sp.
	Flagellum wholly black	7.
7.	Larger ; fourth abdominal segment entirely black	*hirtiventris* n. sp.
	Smaller ; fourth abdominal segment red	*annexus* n. sp.

Parasphecodes cervicalis Cockerell.

Described from the ♀, collected in Tasmania. In December, 1919, Mr. Hacker took both sexes in the National Park, Queensland, where he also found the Tasmanian *Callomelitta littleri*. The specimens of ♀ *P. cervicalis* seem to differ slightly from the Tasmanian form, and when Tasmanian males are available may possibly be separable, but at present I am quite unable to state any valid distinctions. The occurrence of supposed Tasmanian endemics at various points on the mainland begins to carry the conviction that the Tasmanian bee-fauna does not represent a high degree of differentiation since the separation of the island, but rather the survival of a series of old species, some of which are now extinct on the mainland, while others are restricted to limited areas.

The male of *P. cervicalis* is new. It resembles the female, but is more slender, while the clypeus is chrome-yellow except for a large quadrate black mark on each side above. Labrum, mandibles, and antennæ black, the flagellum not strongly moniliform. There is black hair at the apex of the abdomen; the second ventral segment has a median elevation, without any tuft of hair. The abdomen is entirely black, the margins of the segments concolorous. There is a close general resemblance to *P. nigritus* Meyer, from Tasmania.

Parasphecodes solis n. sp.

Male. Length nearly 10 mm., slender, head and thorax black, abdomen entirely chestnut-red, suffused with dusky beyond the third segment, but with no black segments or dark markings; hair of head and thorax dull white, abundant on front and sides of face; some dark hair at end of abdomen; labrum and mandibles black or nearly; clypeus with an extremely broad pale yellow band, emitting a cuneiform extension upward; scape short, flagellum very long, strongly moniliform, the joints of the basal half marked with red beneath; mesothorax entirely dull, with a granular appearance; scutellum bigibbous, dull, and granular, without special tomentum; area of metathorax distinctly defined, angulate posteriorly, covered with very coarse wavy rugæ, between which it is distinctly shining; tegulæ dull red; wings dusky reddish, stigma dark reddish, nervures fuscous; second submarginal cell higher than long, receiving recurrent nervure very near its end; femora black, red at extreme apex; tibiæ red, the anterior pair clear and bright, the hind ones dusky; anterior tarsi dusky red, the others black or nearly; abdomen moderately shining, with excessively fine punctures, close and uniform on first two segments, on first segment extending to the margin; no prominence on under side of second segment.

Sunnybank, 19-11-13 (*H. Hacker*). In Meyer's table and in my table of Tasmanian species, this runs to *P. perustus* Ckll., but is larger, with darker antennæ, &c. It resembles *perustus* in having the third submarginal cell much broader above than second.

Parasphecodes longmani n. sp.

Male. Length about or nearly 8 mm, rather slender, head and thorax black, abdomen dusky-red, with a broad black stain on middle of first two segments, and segments beyond the third wholly black; hair of head and thorax thin, brownish on face, front, vertex, and thoracic dorsum, pure white on cheeks and mesopleura; head broad, orbits strongly converging below; broad band on clypeus, with a cuneiform upward extension, labrum and greater part of mandibles yellow; antennæ black, the flagellum moniliform, not especially long (length somewhat over 4 mm.); front entirely dull, but a shining space in front of middle ocellus; mesothorax and scutellum dull, slightly glistening on disc, very minutely and densely punctured, scutellum bigibbous, without special tomentum; area of metathorax poorly defined, with fine vermiform rugæ; tegulæ bright yellowish-ferruginous; wings hyaline, slightly greyish; stigma dark reddish, nervures fuscous; second submarginal cell nearly square; first recurrent nervure entering base of third submarginal, as in *P. sulthica* Smith; femora black, with red knees; anterior and middle tibiæ and all the tarsi red; hind tibiæ black with broadly red base and a little red at apex; abdomen above with very scanty short hair, venter with much white hair, second ventral segment simple.

Caloundra, 20-1-16 (*H. Hacker*). Rather like *P. minimus* Meyer, but larger, with dark antennæ, &c. The tubercles are red. Dedicated to the Director of the Queensland Museum.

Parasphecodes subrussatus n. sp.

Male. Length about or a little over 8 mm., not very slender, the abdomen broad at base, almost parallel-sided but slightly widening to the fourth segment; head and thorax black, with rather long dull white hair, faintly brownish dorsally; first abdominal segment black, broadly red apically, with a further red extension on sides; second segment red, with a transverse median black mark; third red, with a black spot at each extreme side toward base; fourth and following segments black, but the fourth red beneath, with a black median stain; at least lower half of clypeus shining lemon yellow, with a small median extension; labrum black; mandibles black, dark-reddish apically; flagellum long, clear ferruginous beneath; mesothorax and scutellum dullish, somewhat shining on disc, extremely finely punctured, scutellum bigibbous; area of metathorax poorly defined, with fine rugæ; tegulæ black; tubercles black; wings hyaline, slightly greyish, stigma and nervures ferruginous; second submarginal cell much higher than long, receiving recurrent nervure well before its end; legs black; abdomen shining, the red colour bright; second ventral segment simple.

Kosciusko, 26-1-14 (*A. J. Turner*). Very distinct by the marking of the abdomen, combined with the black tegulæ and legs.

Parasphecodes paramelænus n. sp.

Female. Looks like *P. cervicalis*, with which I had mixed it, but it is a little smaller, with anterior wing about 7 mm.; face narrower, clypeus without a distinct median groove; mesothorax entirely dull black, not at all glaucous, with excessively dense and minute punctures; scutellum densely and minutely punctured; area of metathorax long, with no raised rim, its surface obscurely rugose, except apically; wings paler and strongly reddish; first recurrent meeting second intercubitus; outer side of third submarginal cell without a double curve; first two abdominal segments very finely, closely, and regularly punctured, the depressed apical part of second segment, and first to extreme apex, punctured; second ventral segment hairy, but without a distinct prominence. The apical part of abdomen has short black hair.

National Park, Queensland, Dec., 1919 (*H. Hacker*). *P. atronitens* Ckll. is very closely allied, but distinguished by the colour of wings and sculpture of abdomen.

Parasphecodes lichatinus n. sp.

Female. Length about or nearly 10 mm., anterior wing nearly 8; robust, head and thorax black; abdomen with the first three segments deep chestnut-red, the first with a very broad blackened area across the middle, the third with the hind margin blackened; fourth and following segments black; hair of head and thorax dull whitish, thin on thorax above; clypeus shining, with sparse strong punctures; flagellum red beneath and at extreme tip, the colour almost brick red; mesothorax and scutellum densely and distinctly punctured, but glistening between the punctures; scutellum slightly bituberculate; area of metathorax with coarse irregular rugæ, more or less broken up, and a sharp hind margin; tegulæ dark red; wings reddish, strongly dusky in marginal cell, stigma and nervures piceous, stigma unusually narrow; second submarginal cell large, about square, about as broad above as third, receiving first recurrent nervure almost at apex; legs black, with coarse dark hair on outer side of hind tibiæ and tarsi; abdomen shining, finely punctured, apical part with black hair dorsally.

Ararat, Victoria (*H. W. Davey*). Very close to *P. lichatus* Smith, from Western Australia, but with darker wings, and I think separable.

Parasphecodes hirtiventris n. sp.

Female. Length about 10 mm., robust, head and thorax black, their pubescence fulvous dorsally; abdomen with the first three segments dark red, the others black; first segment with a large T-shaped black mark, third with a transverse dusky cloud in middle, and hind margin darkened; an even narrow line of white cilia overlapping extreme base of third segment; tongue cuneiform, short and broad; clypeus shining, with scattered punctures; antennæ entirely black, scape very long; mesothorax and scutellum dull, extremely densely and minutely punctured; area of metathorax long, shining, the basal half obscurely sculptured; extreme sides of metathorax densely hairy; mesopleura very hairy; tegulæ rufopiceous; wings dusky, darker at apex, stigma and nervures rather dilute sepia; outer recurrent and intercubitus weakened; second submarginal cell broad below, narrowed above, the recurrent nervure joining its extreme apex; legs black, hind legs with pale hair, that on tibiæ shining silvery, hind basitarsi with a bright red tuft at apex; abdomen shining, first two segments with extremely minute punctures; venter extremely hairy.

Ebor, 2-1-14 (*A. J. Turner*). In Meyer's table runs to *P. insignis* Meyer, from Tasmania, but the sculpture is very different. It is also related to *P. arciferus* Ckll. and *P. leptospermi* Ckll. *P. arciferus* differs at once by the area of metathorax and colour of pubescence, and the same may be said of *leptospermi*.

Parasphecodes annexus n. sp.

Female. Length a little over 7 mm., robust, head and thorax black, abdomen broad, chestnut-red, first segment with a very broadly triangular black area, and hind margins of all the segments strongly dusky; hair of head and thorax thin, slightly ochreous dorsally, white on cheeks and pleura; clypeus shining, with sparse punctures, and no median groove; antennæ black; mesothorax and scutellum shining, with small punctures, well separated on disc; area of metathorax semilunar with no raised rim, shining, finely rugose, subplicate basally; tegulæ dark-reddish, anterior margin hyaline; wings hyaline; stigma and nervures dark-brown, outer recurrent and intercubitus extremely weak; second submarginal cell about square, about as broad above as third; first recurrent nervure joining base of third submarginal, as in *P. sulthica* Sm., legs black, hair on hind legs pale, on hind tibiæ silvery, with a green stripe posteriorly; hind basitarsi with a bright red apical brush; abdomen without conspicuous punctures, first two segments excessively minutely punctured; venter hairy.

Adaminaby, N.S.W., 19-10-18 (*A. J. Turner*). In many ways similar to *P. melbournensis* Ckll., but much smaller.

HALICTUS Latr.

The following table separates a series of species in which the mesothorax is metallic, green or blue. Up to the present, thirty-two species of this type have been described from Australia (including Tasmania). Some additions are given below:—

Males . . . . 1.
Females . . . . 3.
1. Clypeus largely yellow, mandibles yellow . . . . . . *purnongensis* Ckll.
Clypeus without yellow . . . . 2.
2. Hind tibiæ light red . . . . *olivinus* n. sp.
Hind tibiæ black, red at extreme ends. (Caloundra, 20-1-16) . . . . *kesteveni* Ckll.

3. Abdomen metallic .. 4.

Abdomen not metallic .. 5.

4. Abdomen bright steel-blue. (Brisbane, 12-2-18) .. *caloundrensis* Ckll.

Abdomen greenish. (Brisbane, 12-2-18) .. *dampieri* Ckll.

5. Abdomen red, head black .. 6.

Abdomen black or dark-brownish .. 7.

6. Smaller; mesothorax shining .. *erythrurus* Ckll.

Larger; mesothorax dullish, with larger scattered punctures. (Oxley, Brisbane, Sept., 1914; Brisbane, 4-9-14, 6-10-14, 26-9-16) .. *brisbanensis* Ckll.

7. Head metallic .. 8.

Head black .. 9.

8. Stigma very dark. (Brisbane, 12-2-18, National Park, Q., Dec., 1919) .. *urbanus* Smith.

Stigma reddish; scutellum shining, steel-blue, contrasting with the green mesothorax *urbanus* var. *lomatiæ* n. var.

9. Mesothorax green, dullish .. *limatiformis* n. sp.

Mesothorax blue .. 10.

10. Mesothorax steel-blue, highly polished; stigma dark .. *humiliformis* n. sp.

Mesothorax not polished; stigma pallid .. *mesocyaneus* n. sp.

The Queensland specimens were all collected by Mr. Hacker.

Halictus purnongensis Cockerell.

The range is greatly extended by a male from Brisbane, 6-10-14 (*Hacker*). It represents a variation with the hind margins of the abdominal segments dark.

Halictus erythrurus Cockerell.

Brisbane, 3-10-16, a variation with tegulæ darker than usual.

Halictus olivinus n. sp.

Male. Length about or nearly 5 mm., slender, head and thorax shining dark olive green, the metathorax steel-blue, contrasting; labrum and mandibles dark-reddish; head unusually broad, eyes strongly converging below, clypeus polished and shining, front dull, shining along orbits; scape black; flagellum long and slender, ferruginous beneath; mesothorax shining but not polished, scutellum highly polished; area of metathorax large, with weak striæ, apical margin thickened; posterior truncation without sharp lateral edges; hair of head and thorax extremely scanty, white; tegulæ pale tes'aceous; wings hyaline, faintly dusky; stigma piceous; marginal nervure dark, the other nervures mainly pallid, the outer recurrent and intercubitus hardly visible; first submarginal cell much larger than the other two combined; second submarginal very narrow, third almost as narrow as second; first recurrent nervure meeting second intercubitus; femora rufopiceous, knees, tibiæ, and tarsi pale ferruginous; abdomen dark brown, brightly polished, venter with erect hair.

Brisbane, 3-3-14 (*H. Hacker*). I am at a loss to associate this with any known female. Among the described males it has some resemblance to *H. dampieri* Ckll., but in that species the area of metathorax is dull and quite different; in the present insect it is concave and shining. It is easily known from *H. hackeriellus* Ckll. by the red tibiæ.

Halictus urbanus var. **lomatiæ** n. var.

Female. Mesothorax peacock-green; scutellum bright blue, highly polished, contrasting; legs rufotestaceous; stigma rather dilute reddish-brown; flagellum bright ferruginous beneath. Outer recurrent nervure and intercubitus hardly visible.

Sunnybank, Brisbane, on flowers of *Lomatia*, 13-5-12. (*H. Hacker.*) I had taken this for a distinct species, on account of the shining blue scutellum and paler stigma, but microscopic examination shows that the hind spur, sculpture of area of metathorax and scutellum, &c., are precisely as in *H. urbanus.*

Halictus limatiformis n. sp.

Female. Length about 5 mm., black, with the mesothorax only (not even scutellum) dark bluish-green; pubescence dull white, abundant and curled on under side of abdomen; apical part of mandibles very dark-reddish; front dull, orbital margins shining; antennæ black; mesothorax shining but not highly polished, with scattered punctures, scutellum shining; area of metathorax granular and dull, feebly plicate, with a shining margin; tegulæ dark castaneous; wings dusky hyaline; stigma large and very dark, nervures brown, outer recurrent and intercubitus almost obsolete; first recurrent nervure ending just before second intercubitus; third submarginal cell short, little longer than second, legs black, anterior knees red; abdomen shining black, without bands Under the microscope the mesothorax is seen to be minutely tessellated, with widely scattered distinct punctures. Area of metathorax entirely without a sharp rim. Hind spur pectinate with small teeth.

National Park, Queensland, Dec., 1919 (*H Hacker*). Very close to the Tasmanian *H. limatus* Smith, but that has the area of metathorax more distinctly striate, and pale testaceous tegulæ. It may be only a race of *limatus.*

Halictus humiliformis n. sp.

Female. Closely resembling *H. limatiformis*, but differing thus:—Mesothorax shining blue, with a polished surface; area of metathorax with fine but regular and distinct plicæ or striæ (as in *H. limatus*, from which it differs by the shining mesothorax). By the small shining mesothorax it agrees with *H. humilis* Smith, but from that it differs by the black legs, with anterior knees red, and the entirely black antennæ. The hind spur is not pectinate; the scutellum is very sparsely punctured, and the surface of the mesothorax, between the punctures, shows only traces of tessellation.

Ebor, N.S.W., 30-12-15 (*A. J. Turner*).

Halictus mesocyaneus n. sp.

Female. Length about 5 mm., head and thorax black except the mesothorax, which is deep blue, somewhat shining, but not polished; legs black (anterior knees not red); abdomen dark brown, suffused with dark-reddish, the hind margins of the segments paler; venter with long curled hair. Mandibles reddened apically; flagellum obscurely brownish beneath; greater part of front somewhat shining; scutellum shining; area of metathorax with delicate radiating striæ, and a shining rim; tegulæ reddish testaceous; wings yellowish hyaline, stigma large, pale-reddish; abdomen broad, shining. The area of metathorax is microscopically sculptured between the raised lines or plicæ. The mesothorax is microscopically tessellate, with widely scattered extremely weak punctures.

Bribie Island, 1-4-18 (*Hacker*). Smaller than *H. inclinans* Smith, and easily separated by the polished abdomen and black scutellum.

Halictus bicingulatus Smith.

Mr. Hacker has collected this as follows :—Males, Bribie I., 2-11-13, 2-11-15; females, Brisbane, 18-9-14. Sunnybank, Brisbane, at flowers of *Leptospermum*, 9-9-12; Kelvin Grove, 14-9-12, entering a hole in a clay bank.

Nomia moerens Smith.

National Park, Q., Dec., 1919 (*Hacker*).

Anthophora lilacina Cockerell.

Misprinted "*lilacine*" in Mem. Qu. Mus., VII, p. 84, but given correctly in Hacker's Catalogue.

GNATHOPROSOPIS Perkins.

Gnathoprosopis amiculiformis (Cockerell).

Prosopis amiculiformis must go in *Gnathoprosopis*. A female was taken at Brisbane, 17-10-16 (*Hacker*).

Gnathoprosopis bituberculata (Smith).

Males were collected by F. M. Littler in Tasmania; at Launceston, 7-11-15; and St. Helens, 14-1-16. The species is new to Tasmania.

Gnathoprosopis amicula (Smith).

Females, National Park, Q., Dec., 1919 (*Hacker*); a form with rather dusky wings. The chrome-yellow face-marks and much narrower clypeus readily distinguish this from *G. hackeri*.

Gnathoprosopis simpliciventris n. sp. (? **hackeri** var.).

Male. Agrees with *G. hackeri*, except that the under side of the abdomen has a pair of low inconspicuous elevations instead of large dentiform processes.

Brisbane, 6-10-14 (*Hacker*). This was taken on the same day as a male *hackeri*, and it seems nearly certain that it is a form of that species, in spite of the great difference and the prominences of the abdominal venter. A final decision can only be reached by observations in the field.

Gnathoprosopis amiculina n. sp.

Female (Type). Resembles G. *amicula*, but is somewhat less robust, with the anterior and middle tibiæ entirely black, and the hind ones narrowly cream-colour at base. The second submarginal cell is shorter, the scape is entirely black (though the flagellum is ferruginous beneath), and the lateral face-marks are more pointed above.

Male. Described as male of *amicula*, Mem. Queensl. Mus., V, p. 198.

The type is from Brisbane, 17-10-16 (*Hacker*). This is the Brisbane so-called *amicula* ; renewed study, with more material, convinces me that it must be separated.

Gnathoprosopis hackeri Cockerell.

Female. Length about 7 mm., robust, considerably larger than *amicula* or *amiculina* ; lemon-yellow lateral face-marks and swollen orange collar and tubercles as in *amicula*, but the orange of the prothorax is broadly interrupted in middle, and the lateral face-marks are distinctly narrower, obliquely truncate above. Scape black, flagellum ferruginous beneath ; mandibles as usual in the genus ; mesothorax and scutellum finely punctured, but the punctures are distinctly visible under a lens ; anterior tibiæ rufous on inner face ; hind tibiæ with only a small basal cream-coloured spot ; tegulæ black ; second submarginal cell large and broad, first recurrent nervure meeting the intercubitus ; abdomen with excessively fine punctures, the basal segment shining.

Brisbane, 8-10-18 (*Hacker*). I give a description, as no adequate account of this sex has appeared.

PROSOPIS Fabricius.

Prosopis cyaneomicans nigrescens Cockerell.

Bribie Island (*Hacker*).

Prosopis eburniella Cockerell.

Female. Brisbane, 24-9-18 (*Hacker*).

Prosopis coronata Cockerell.

Male. Variety with supraclypeal mark small, tranverse, entirely red.

Brisbane, 6-10-14 (*Hacker*).

Prosopis kelvini Cockerell.

Brisbane, 8-9-18, two males (*Hacker*).

Prosopis leptospermi n. sp.

Female. Running in my M.S. key to *Gnathoprosopis hackeri*, but entirely different in colour of tubercles and legs, and other characters. It could also be run near *amicula*, but is quite different. Length about 7·5 mm., robust, black, with dull pale-yellow markings, consisting of cuneiform lateral face-marks (ending obtusely above, away from orbital margin), interrupted band on prothorax above (not approaching tubercles), and tubercles; legs black, the anterior tibiæ with an elongate red patch in front; mandibles sulcate, not of the broad *Gnathoprosopis* type; clypeus entirely dull, with a fine median raised line; scape long black; flagellum unusually short, very obscure reddish beneath; front dull; cheeks beneath with long white hair; mesothorax and scutellum dull, extremely finely punctured; postscutellum large; basal area of metathorax short; tegulæ black; wings dusky, with black stigma and nervures; second submarginal cell very broad, receiving recurrent nervures some distance from base and apex; more of marginal nervure is on second submarginal cell than on first; legs ordinary, spurs pale ferruginous; abdomen dull without evident punctures, first two segments laterally with very thin white hair; fifth ventral segment with a fringe of short hair, appearing pale reddish in some lights.

Sunnybank, Brisbane, at *Leptospermum* flowers, 17-9-14 (*Hacker*).

Prosopis crassifemorata n. sp.

Male. Length about or hardly 6 mm., black, with the face below antennæ, and the greatly swollen upper border of prothorax (interrupted in middle), connected with and including tubercles, bright chrome-yellow; orbits converging below, face dull, clypeus very long, no supraclypeal mark; scape rather short and thick, pale at base and apex; flagellum dull pale red beneath; front dull; mesothorax and scutellum somewhat shining, very minutely punctured; metathorax rounded, not sharply truncate, with only a very narrow basal rugose band; tegulæ partly pallid; wings hyaline, very faintly dusky, stigma dark brown; second submarginal cell broad, receiving recurrent nervures near base and apex; legs black, anterior tibiæ pale red in front; hind femora very stout, covered beneath with dense white felt-like hair; hind tibiæ swollen; abdomen shining, with excessively minute punctures; venter simple.

Sunnybank, Brisbane, 19-11-13 (*Hacker*). A peculiar little species, best recognised by the hind femora. It runs to 36 in my table.

Prosopis xanthopsyche n. sp.

Male. Length about 4·5 mm.; black, with the face below antennæ (the surface dull), bright chrome-yellow, including a quadrate supraclypeal mark; lateral face-marks broadly truncate above, but notched; mandibles (except tips) and labrum bright yellow; face rather broad; scape ordinary, with a yellow line in front; flagellum long, pale dull reddish beneath; upper border of prothorax (not reaching tubercles) and tubercles yellow; mesothorax and scutellum dull, not evidently punctured (the compound microscope shows minute well separated punctures on a tessellated surface); metathorax rounded, distinctly glistening above, the extreme base rugose and dull; tegulæ small and dark; wings dusky hyaline, stigma dark brown; recurrent nervures joining first and second submarginal cells near ends; second submarginal narrowed above; anterior knees, tibiæ (except a large mark behind) and tarsi, middle tibiæ at base and apex, and hind tibiæ broadly at base all yellow; middle basitarsi and basal half of hind ones yellowish-white; abdomen dullish, with a satiny lustre, venter simple.

Brisbane, 24-9-18 (*Hacker*). The specific name is fanciful, given because the yellow area of face, viewed upside down, has the outline of a moth with wings directed backward. In my table this runs to 36, but is unlike any of the species falling in that vicinity.

Prosopis amatula n. sp.

Male. Length about 3·5 mm., black, slender, with the face below antennæ and narrow upward extensions along orbits, the very short (heart-shaped) scape, second antennal joint (short and transverse) and the tubercles very pale yellow; face rather broad, polished; flagellum long, very pale yellowish-red beneath; labrum and mandibles entirely pale yellow; mesothorax and scutellum shining, but minutely sculptured all over; area of metathorax broad, ill-defined, microscopically cancellate; wings hyaline, stigma sepia; first recurrent nervure joining first submarginal cell near end, second meeting outer intercubitus; legs light yellow; hind femora black, yellow at base and apex; hind tibiæ with apical half dark; abdomen slender, claviform, second segment pale red apically.

Caloundra, Q., 20-1-16 (*H. Hacker*). Runs to *P. primulipicta* Ckll. in my table, but is very distinct. It may also be compared with *P. asinalla* Ckll., but that is larger, with longer clypeus and supraclypeal area, &c. *P. bacillaria* Ckll. differs at once by the slender scape and dull mesothorax. *P. minuscula* Ckll. is readily distinguished by the scape and absence of yellow supraclypeal area. *P. pulchripes* Ckll. has a slender scape, larger (deeper) stigma, &c. Under the compound microscope the second antennal joint of *P. amatula* appears circular, about as broad as long.

Prosopis brevior Cockerell.

Male. One from Caloundra, 20-1-16, taken with *P. amatula*. One Oxley, Brisbane, 17-9-14 (*Hacker*).

Prosopis melanocephala n. sp.

Female. Length about 5 mm., head and thorax black, without light markings, but flagellum bright chestnut-red; legs black, the tarsi more or less reddish; abdomen shining chestnut-red, with a black patch on middle of first segment, and the other segments more or less suffused with dusky medially, the basal part of third and fourth segments slightly purplish; tegulæ black; wings hyaline, stigma black; second submarginal cell broad, receiving recurrent nervures very near base and apex; clypeus broad; face and front striato-punctate; a slender groove (visible under compound microscope) up middle of front; mesothorax dull and closely punctured; base of metathorax coarsely rugose.

Type from Darra, 14-10-13 (*Hacker*). Also from Brisbane, 14-11-12 (*Hacker*). A very distinct species, running out at 7 in my table.

Prosopis ancorata var. **subconstricta** n. var.

Male. Length about 5 mm., face-marks cream-colour; first abdominal segment dark red. Very close to *P. constricta* Ckll., with the same face-markings, antennæ, &c., but abdomen black with the first segment dark red (bright chestnut-red at sides of base) and second with apical margin narrowly reddened; tubercles black with a slight red edge; wings brownish.

On flowers of *Malaleuca preissiana*, Brisbane (*Hacker*). *P. ancorata* appears distinct from *P. constricta* Ckll., but the variety now described is intermediate, and it will probably prove that all three are forms of a single species.

Prosopis scintillans n. sp.

Male. Length hardly 3·5 mm., slender, clypeus, labrum, mandibles, and narrow bands along orbits (ending very slenderly about halfway up front) all white; scape and second antennal joint pale yellowish beneath, the rest of antennæ pale red beneath; head round seen from in front; mesothorax and scutellum dullish; the compound microscope shows vertex, mesothorax, and scutellum all with distinct well separated punctures on a tessellated surface; metathorax rounded, the broad base with microscopic transverse lineolation, more or less joined to form tessellation, but with no trace of plicæ or rugæ; tegulæ dark brown, wings hyaline, faintly dusky, iridescent; stigma dark brown; second submarginal cell small, recurrent nervures meeting the intercubitals; upper border of prothorax dark, but tubercles apically yellow; anterior knees and tibiæ very pale-reddish, the tibiæ with a faint dusky cloud; middle and hind tibiæ white or reddish-white at base and apex; all the tarsi light; abdomen shining reddish-black, the venter simple. There is a very small supraclypeal mark.

Brisbane, 26-9-16 (*Hacker*). Goes to 34 in my table, and appears to be close to *P. scintilla* Ckll., but with white face-markings. It may possibly be a subspecies of *Scintilla*.

The above species of *Prosopis* and *Gnathoprosopis*, none of which have the scutellum or postscutellum yellow or orange, may be separated by the following table :—

	Clypeus black (females)	1.
	Clypeus light (males)	7.
1.	Face entirely black, abdomen blue	*cyaneomicans nigrescens* Ckll.
	Face entirely black, abdomen red	*melanocephala* Ckll.
	Face with light lateral marks	2.
2.	Markings white	*eburniella* Ckll.
	Markings yellow	3.
3.	Light colour of collar not continuous with that of tubercles	*leptospermi* Ckll.
	Yellow or orange of collar continuous with that of tubercles	4.
4.	More than basal half of hind femora pale orange	(*Gnathoprosopis*) *amicula* Sm.
	Less than basal half of hind femora pale, the colour yellowish-white	5.
5.	Clypeus narrow ; first recurrent nervure meeting intercubitus	(*Gnathoprosopis*) *amiculina* Ckll.
	Clypeus broad	6.
6.	Larger ; first recurrent nervure meeting intercubitus	(*Gnathoprosopis*) *hackeri* Ckll.
	Smaller ; first recurrent nervure falling short of intercubitus	(*Gnathoprosopis*) *amiculiformis* Ckll.
7.	Antennæ entirely bright ferruginous	*coronata* Ckll.
	Antennæ not so coloured	8.
8.	Scape circular, with a yellow mark in front	*kelvini* Ckll.
	Scape oval, entirely black	(*Gnathoprosopis*) *bituberculata* Smith.
	Scape ordinary, or (in *P. amatula*) very short	9.
9.	Face-marks bright orange ; orange of collar joining that of tubercles ; hind legs with tegument entirely black	*crassifemorata* Ckll.
	Face-marks pale orange ; yellow of collar separated from that of tubercles ; hind legs partly yellow	*xanthopsyche* Ckll.
	Face-marks pale yellow or white, not orange	10.
10.	Collar bright orange, continuous with tubercles ; venter with low tubercles	(*Gnathoprosopis*) *simpliciventris* Ckll.
	Collar not orange ; small species	11.
11.	Scape very short, light yellow ; middle tibiæ entirely yellow	*amatula* Ckll.
	Scape otherwise ; middle tibiæ at least largely dark	12.
12.	A cuneiform black mark at each side of clypeus	*ancorata subconstricta* Ckll.
	No such marks on clypeus	13.
13.	Larger ; face-marks pale yellow or creamy-white ; supraclypeal mark well developed	*brevior* Ckll.
	Smaller ; face-marks clear white ; supraclypeal mark represented by a minute transverse mark just above clypeus, hardly noticeable	*scintillans* Ckll.

BINGHAMIELLA Cockerell.

Binghamiella antipodes (Smith)

Bright, V. (*H. W. Davey*).

EURYGLOSSA Smith.

Euryglossa furcifera Cockerell.

Female. Brisbane, 15-2-16 (*Hacker*).

Euryglossa calliopsiformis Cockerell.

Female. Brisbane, 10-10-16, and 8-10-18 (*Hacker*); Logan Road, Brisbane, at *Leptospermum*.

Male. Sunnybank, on flowers of *Jacksonia scoparia* R. Br., unusually small, about 4·3 mm. long, with second submarginal cell shorter, and its upper apical angle more acute. Another male, Brisbane, 10-10-16 (*Hacker*), has the band on cheeks broader, a triangular yellow mark on the postscutellum, and the second submarginal cell more as in the female, with the first recurrent joining it far from base. Possibly the *Jacksonia* specimen should be separated, but at present I conclude that we have a single very variable species. The scutellum is dark with a variable yellow band on hind margin, and the axillæ have yellow spots.

Euryglossa terminata Smith.

I saw the type in the Saunders collection at Oxford, and noted that it was a large species, wings dilute fuliginous; fifth abdominal segment red, with golden hair. Smith's measurement, "length 4 lines," is evidently erroneous. It therefore appears practically certain that *E. hæmatura* Ckll. is identical with *terminata*.

Euryglossa depressa Smith.

A female from Portland, Victoria (*H. W. Davey*), is evidently the true *depressa* of Smith, as is shown by the broad subtriangular facial foveæ, which are described by Smith. The tarsi are dark (hind tarsal joints red at ends), not rufo-piceous as described by Smith, but the description otherwise agrees very well. The pale yellowish fulvous hair on occiput is as indicated by Smith. I noted at Oxford that *E. depressa* had clear hyaline wings and very broad abdomen; in the present specimen the abdomen is very broad (4 mm. wide), and the wings, which are 6·7 mm. long, are hyaline tinged with brown, the stigma ferruginous. The disc of mesothorax and scutellum are sparsely punctured, the punctures on the scutellum small; flagellum very obscure brown beneath, bright red at extreme tip. The mesothorax shows a broad concavity mesad of each wing, traversed by the parapsidal groove.

My *E. depressa sparsa* appears to be correctly considered a variety of this, but the species I had as *E. depressa* Sm., from Victoria, is distinct, and may be described as follows:—

Euryglossa polysticta sp. n.

Female. Length 8·5-9·5 mm.; similar to *E. depressa*, but smaller and with narrower abdomen; facial foveæ linear; flagellum dark, not red at tip; mesothorax anteriorly with very numerous minute punctures, and scutellum quite closely punctured; wings slightly (sometimes conspicuously) brownish, stigma very dark; hair of occiput very pale yellow; abdomen dull green, hind margins of segments black; legs black, the tarsi ferruginous apically. Very close to *E. subsericea* Ckll., from Mackay, Queensland, but larger, with longer second submarginal cell, and much broader face.

Type from Dandenong, Victoria, Nov., 1902 (*T. Kershaw*). Also occurs at Croydon.

Euryglossa hypoleuca Cockerell.

Mr. Hacker has discovered the female, and sends specimens from Caloundra, 20-1-16. This female resembles that of *E. albocuneata* Ckll., but is less robust, with the clypeus narrower, the cuneiform lateral face-marks longer, the lower margin of clypeus, mandibles (except tips), and labrum bright ferruginous, the antennæ (including scape) ferruginous on outer side. The knees, tarsi, and anterior tibiæ in front are red, but the hind tibiæ are white basally. The face is concave. The abdomen is without distinct banding, but the hind margins of the segments are narrowly pallid.

Euryglossa politifrons sp. n.

Female. Length nearly 6 mm., with very broad abdomen; head black, with the polished, bare, hardly punctured clypeus ferruginous; supraclypeal area highly polished, dark reddish; front shining, with a median groove; scape red, with the apex intense black; labrum and basal half of mandibles reddish; mesothorax and scutellum bare, ferruginous, polished, with minute very sparse punctures; prothorax red, dusky below at sides; pleura black; axillæ much lighter red than scutellum; postscutellum and upper part of metathorax red; tegulæ ferruginous; wings hyaline, stigma and nervures dusky reddish; basal nervure falling far short of nervulus; second submarginal cell receiving first recurrent nervure far from base, the second almost or quite at apex; legs pale ferruginous, anterior and middle femora suffused with dusky above; abdomen ferruginous, with subquadrate black marks at extreme sides of the segments, apex dusky reddish.

Emerald, 1916 (*E. Allen*). Allied to *E. frenchii* Ckll., but distinguished by the red legs and clypeus, as well as the small size.

Euryglossa occipitalis sp. n.

Female. Length about 10 mm., very robust; head and thorax black, abdomen very broad, ferruginous, black (with black hair) at tip, and the segments with inconspicuous biundulate dusky (somewhat bluish) bands, failing sublaterally; legs very dark brown, small joints of hind tarsi clear red. Face very broad, shining, clypeus sparsely punctured; mandibles with an orange patch on outer side before apex, and just before this a reddish area; antennæ dark, flagellum reddish beneath subapically; occiput with bright orange-fulvous hair; mesothorax and scutellum polished, sparsely punctured; tegulæ reddish; wings hyaline, slightly dusky, stigma dark reddish, nervures fuscous; second submarginal cell long, receiving recurrent nervures some distance from base and apex; abdomen very sparsely and feebly punctured; venter light yellowish-ferruginous.

Portland, Victoria (*H. W. Davey*). Closely related to *E. victoriæ* Ckll., but without metallic colours on head and thorax, and abdomen with much more red.

Euryglossa longicornis sp. n.

Male. Length about 9 mm., not very robust, black, the abdomen with a satiny lustre, and the hind margins of the segments obscurely brownish; apex of abdomen pointed. Head thick, face broad, eyes not converging below; scape robust, shining black; flagellum very long, with the first five or six joints dull ferruginous beneath; third antennal joint short, but not so short as second; face, labrum, and mandibles black; clypeus and supraclypeal area shining, with strong moderately close punctures; hair of cheeks white, of front and occiput tinged with yellowish; mesothorax truncate anteriorly, very closely punctured but shining; scutellum with stronger rather sparse punctures; tegulæ dark reddish; wings brownish, stigma and nervures dark brown; basal falling short of nervulus; second submarginal cell receiving first recurrent nervure some distance from base, but second recurrent meeting outer intercubitus; knees, anterior tibiæ, middle and hind tibiæ, except broad dusky clouds, and all the tarsi, rather deep red, the colour of the anterior tibiæ bright; abdomen with no distinct bands

Kelvin Grove, Brisbane, 27-11-11 (*Hacker*). A distinct species, which I cannot associate with any described female. It must be rare at Brisbane, as the specimen taken in 1911 remains unique.

Euryglossa walkeriana Cockerell.

Female. Brisbane, 12-9-16 (*Hacker*). Previously known only by the unique type, collected at Launceston, Tasmania. It seems to be a little smaller than the type, and the hind margin of the first abdominal segment is red.

Euryglossa neglectula subsp. **mica** Cockerell.

Female. Brisbane, 20-9-16 (*Hacker*). Male. Brisbane, 3-10-16 (*Hacker*). Typical *neglectula* was described from "Australia" from an old specimen in F. Smith's collection.

Euryglossa reginæ Cockerell.

Male. Brisbane (*Hacker*); Ebor, N.S.W., 1-1-16, a variation with the flagellum dark, reddened only at base beneath.

Euryglossa nubifera sp. n.

Male. Length about 6 mm., black, the head and thorax with rather abundant dull white hair, and no light markings; face broad but orbits converging below; clypeus dullish, with long pale hair, not conspicuously punctured; mandibles dark red apically; front dull; facial foveæ linear; antennæ long and rather thick, flagellum obscure reddish beneath; mesothorax and scutellum dullish, without evident punctures (the compound microscope shows a minutely tessellate surface); tegulæ dark, with broad reddish margin posteriorly; wings hyaline, faintly dusky, beautifully iridescent, with a large fuliginous apical cloud; stigma pale reddish with dark margin, nervures fuscous; second submarginal cell large, receiving recurrent nervures not very far from base and apex; femora black with red knees; tibiæ and tarsi bright ferruginous, the hind ones strongly infuscated posteriorly; first three abdominal segments dull black, with the broad hind margins (that on first reddish) shining; rest of abdomen shining; apex with a red spoon-shaped plate; venter red, the second and third segments with dark transverse bands.

Coolangatta, Queensland, 7-9-13 (*Dr. A. J. Turner*). Easily recognised by the clouded apices of anterior wings.

A female from Coolangatta, of the same date, was set apart as an entirely different species, but on closer inspection it is evidently *nubifera*. It is nearly 8 mm. long, much more robust than the male, and the strongly dusky (brownish) wings have the apical cloud indistinct though perceptible. The outer intercubitus has an angle at the middle, from which proceeds an appendicular vein, and there is another similar short appendicular vein near its lower end. These are only slightly indicated in the male. The legs are coloured as in the male, except that the hind tibiæ are black. and their tarsi largely black. The face is broad, not hairy, the clypeus with very few weak punctures. Flagellum ferruginous beneath except at base; mandibles with only a faint suggestion of red near apex; facial foveæ linear. The abdomen has the first two segments dull, except the margins, the others shining. The mesothorax and scutellum are dullish, without distinct punctures. There is black hair on the abdomen just below the apex.

Euryglossa jucunda Smith.

Female. Ebor, N.S.W., 1-1-16. Length about 7 mm.; sides of face with much white hair; tegulæ dark reddish-brown; stigma same colour as tegulæ; only mall joints of tarsi red. This is what I have determined as *jucunda*, but it is possible that actual comparison with the type from Western Australia would show that the form from New South Wales and Queensland is separable. It is also possible, judging from Smith's account, that the original *jucunda* was a mixture of two species.

The following key will facilitate the separation of the species of *Euryglossa* in the present collection. I have also added the species of *Pachyprosopis* :—

	Abdomen red	1.
	Abdomen not red	2.
1.	Mesothorax red	*E. politifrons* Ckll.
	Mesothorax black; wings hyaline	*E. occipitalis* Ckll.
2.	Mesothorax dark green	*E. walkeriana* Ckll.
	Mesothorax yellow	*E. furcifera* Ckll.
	Mesothorax black, marked with yellow; clypeus yellow	3.
	Mesothorax entirely black	5.
3.	Scape dark; clypeus with two dark spots; a yellow spot on front	*E. calliopsiformis* Ckll. ♀
	Scape yellow, at least in front	4.
4.	Axillæ spotted with yellow	*E. calliopsiformis* Ckll. ♂
	Axillæ entirely black	*P. humeralis* Ckll.
5.	Face with light markings	6.
	Face entirely black	7.
6.	Legs mainly black; region of mouth red	*E. hypoleuca* Ckll.
	Legs yellow; cheeks black	*P. aurantipes* Ckll.
7.	Males; antennæ long and slender	8.
	Females; antennæ shorter	13.
8.	Large species, about 9 mm. long	*E. longicornis* Ckll.
	Much smaller	9.
9.	Flagellum light red beneath	10.
	Flagellum dark	11.
10.	Apex of abdomen red	*P. barbata* Ckll.
	Apex of abdomen not red	*E. reginæ* Ckll.
11.	Wings with a conspicuous apical cloud	*E. nubifera* Ckll.
	Wings without an apical cloud	12.
12.	Larger; hind tibiæ largely red	*E. reginæ* Ckll., var.
	Smaller; hind tibiæ without red	*E. neglectula mica* Ckll.
13.	Large and robust; anterior wing about 7 mm. long; abdomen greenish	*E. depressa* Smith.
	Much smaller	14.
14.	Abdomen metallic; only small joints of tarsi red	*E. jucunda* Smith.
	Abdomen not metallic; tarsi largely red or nearly all red	15.
15.	Larger; middle tibiæ red in front	*E. nubifera* Ckll.
	Smaller; middle tibiæ black	*E. neglectula mica* Ckll.

PACHYPROSOPIS Perkins.

Pachyprosopis aurantipes Cockerell.

Brisbane, 3-10-12 (*Hacker*).

Pachyprosopis humeralis Cockerell.

Oxley, Brisbane, 24-9-14 (*Hacker*).

Pachyprosopis barbata Cockerell.

Male. Sunnybank, Brisbane, 19-11-13 (*Hacker*); Tambourine, 23-10-12.

CERATINIDÆ.

NEOCERATINA Perkins.

Neoceratina australensis Perkins.

Glen Innes, N.S.W., April 28, 1916. One female. The mesothorax and scutellum are dark-green. Previously known from Queensland.

EXONEURA Smith.

Exoneura insularis Cockerell.

Stradbroke Island, five females, Sept. 17, 1915 (*Hacker*).

Exoneura bicolor Smith.

Armidale, N.S.W., 5-2-15, two females; Stanthorpe, Q., 6-11-14, one female..

Exoneura nitida n. sp.

Female. Length about 6 mm.; black, with the margins of the fourth and fifth abdominal segments very narrowly and often hardly perceptibly reddened; eyes rather pale purplish-brown; face and front highly polished and shining; face broad, orbits slightly converging below; clypeus with a very broad creamy-white band, broadest above where it occupies the whole width of the clypeus; flagellum obscurely brownish beneath; thorax and first three segments of abdomen smooth and shining; tubercles cream-colour; tegulæ black; wings dilute brown, stigma and nervures very dark; under side of thorax with short pale hair; hind tibiæ and tarsi with much black hair.

Male. Length about 6 mm.; similar to this sex of *E. aterrima*, but larger, head broader, eyes larger, reddish-brown; white (creamy-white) area on face broader; wings browner. The face is bare, except for a very scanty short pale pubescence.

Stradbroke Island, Q., Sept. 17, 1915, four females, 1 male (*Hacker*). Very close to *E. aterrima* (Ckll.). but larger, with brownish wings and black legs. Also near *E. botanica* Ckll., but differing in the legs and other characters.

Exoneura robusta n. sp.

Female (Type). Length about 6·5 mm.; robust, black, the very broad abdomen shining dark chestnut-red; with the first segment (except apical margins laterally), nearly all of second, and a transverse arched band on third, black; face very broad, orbits not converging; clypeus with a broad cream-coloured band, which in the type specimen is urn-shaped and pointed below, but in others variable, hooked at sides above, and reaching clypeal margin below the sides irregular; mandibles dark reddish in middle; antennæ dark; mesothorax dullish, not highly polished; tubercles black, with a fringe of grey hair; tegulæ black, reddish posteriorly; wings strongly reddened; stigma dusky red, margined with darker; nervures fuscous; venter of thorax with shining white hair; hair on hind tibiæ and tarsi reddened anteriorly.

Male. Length about 6·5 mm.; more slender, with the usual male characters. Face narrow, with long black hair, and no light markings; stigma narrower and darker; tibiæ apically, and all the tarsi red; abdomen darker, even the apical segments suffused with black. This is possibly a different species, but probably belongs here.

National Park, Q., Dec., 1919, four females, one male (*Hacker*). Close (♀) to *E. hamulata* Ckll., with the same broad face, but easily distinguished by the much darker legs, only partially and very obscurely reddened, if at all. The abdomen also is much darker. The male is remarkable for the entirely black face.

Exoneura baculifera n. sp.

Female. Length somewhat over 6 mm., but smaller than *E. robusta*; black, robust, with the broad abdomen dark chestnut-red, the first two segments mainly black, and a transverse dusky cloud on third; knees, anterior and middle tibiæ apically, and their tarsi, rather dusky-red; clypeus with a narrow rod-like pale yellow stripe, often subobsolete; orbits converging below; antennæ dark; tegulæ piceous, reddest behind; wings strongly brownish, or reddish, stigma and nervures dusky ferruginous; tubercles dark; hind tibiæ and tarsi with much black hair, shining reddish at apex of tibiæ

National Park, Q., Dec., 1919, five females (*Hacker*). Allied to *E. angophoræ obliterata* Ckll., but easily separated by the dark legs and abdomen. It is to *obliterata* what *robusta* is to *hamulata*.

Exoneura excavata n. sp.

Female. Length about 7·5 mm.; black, with the abdomen dark chestnut-red, the first segment with a broad blackish suffusion on disc; anterior knees, tibiæ apically, and all the tarsi dark red; in certain lights the middle and hind tibiæ appear to be bright red above, but this is due to remarkable coppery hair; the hair on hind tarsi is also red, subappressed; face broad, excavated and basin-like, shining (though the clypeus is minutely punctured), wholly black; labrum convex, dark red; mandibles reddish; antennæ entirely dark; mesothorax and scutellum polished; tubercles black; hair on under side of thorax pale reddish; tegulæ piceous; wings strongly reddish; stigma dusky-red with darker margin, nervures dusky-reddish: apical part of abdomen with short red hair.

National Park, Q., Dec., 1919, one female (*Hacker*). A remarkable species, easily known by the black excavated face.

Exoneura diversipes n. sp.

Male. Length about 7 mm.; black, the knees, tibiæ at extreme apex, and middle and anterior tarsi pale reddish, hind tarsi dark reddish; eyes very large, converging below; face with a very broad reversed T of greenish-white, including all of clypeus except a narrow stripe down each side; lateral marks represented by short slender lines running up from the ends of the arms to the T; labrum greenish-white; face with long black hair; antennæ entirely black; hair of head and thorax above long, brownish-black, pleura with blackish hair, under side of thorax with white; tegulæ black; wings hyaline, stigma and nervures clear ferruginous; all the femora, and anterior tibiæ, and tarsi slender, hind tibiæ slender basally and broad apically, their basitarsi long and very thick.

National Park, Q., Dec., 1919, three males (*Hacker*). Very distinct from all described males, and I know of no female to which it could be assigned.

Exoneura rhodoptera n. sp.

Female. Length about 6 mm.; very robust, black, with the abdomen marked with dark red, at sides of first and second segments, a pair of hook-shaped marks on second segment, a transverse band (weak or broken sublaterally) on third, base of fourth, and an indistinct transverse band on fifth; face broad, orbits parallel; clypeus with a broad median cream-coloured bar, irregular along the margins, and emitting at the upper end very long hook-like extensions, the whole upper margin of clypeus being narrowly pale; on each side of the lower end of the pale bar is a reddish area; no lateral face-marks; labrum black; flagellum obscure reddish beneath; tegulæ reddish; wings strongly reddish-fuliginous, stigma and nervures dark-reddish; tubercles black; femora with a pale red stripe above, not reaching base; anterior and middle tibiæ and tarsi dark red; hind legs darker.

Stradbroke Island, Q., Sept. 17, 1915, one female (*Hacker*). Allied to *E. hamulata* Ckll., but with very much darker abdomen, legs, and wings.

Exoneura perpensa n. sp.

Male. Length about 6 mm.; head and thorax black, with long hair, black on head, dull white on thorax, very faintly yellowish dorsally; head transverse; eyes very large and convex, face narrower, in middle hardly so broad as an eye; clypeus and labrum greenish-white, the light facial area like a reversed wineglass with an extremely thick stem; no lateral marks; antennæ black; mesothorax and scutellum not highly polished; tegulæ dark; wings hyaline, faintly reddish, pale clear red at base; stigma narrow, ferruginous; nervures ferruginous; basal nervure strongly arched, falling far short of nervulus; femora and anterior and middle tibiæ and tarsi slender; hind tibiæ claviform, their basitarsi long and thick; knees, anterior tibiæ except basal half behind, hind tibiæ in front and apically behind, hind tibiæ at apex in front and anterior and middle tarsi all light ferruginous; abdomen parallel-sided, broad at base (slender basally in *bicolor*), first segment black, second black with dull red apical margin, third with broader red margin, fourth red clouded with dusky, fifth and sixth more strongly clouded; venter clear red except base and apex.

Armidale, N.S.W., 5-2-15 (*Dr. A. J. Turner*). This is structurally allied to *E. diversipes.* I cannot refer it to any described species.

Exoneura abstrusa n. sp.

Male. Length about 6·5 mm.; head, thorax, and abdomen black; knees, anterior, and middle tibiæ, and anterior tarsi reddened, the anterior tibiæ clear light ferruginous, with a large elongate black mark basally on outer side, middle tibiæ much more obscurely coloured, with a larger black mark; head and thorax with rather long thin pale hair, tinged with brownish dorsally; eyes very large; clypeus (except a small spot on each side of middle), labrum, and linear lateral face-marks clear ivory-white, the face-marks diverging from the clypeus at the lateral spots, and ending very acutely some distance below level of upper margin of clypeus, which is straight; antennæ black; tegulæ very dark-brown; wings hyaline, faintly dusky, stigma and nervures dull ferruginous; anterior and middle tibiæ and tarsi slender, but their femora stout; hind femora rather robust, with much white hair beneath; hind tibiæ claviform, very broad apically, hind basitarsi very thick; abdominal venter reddish.

Brisbane, Q., 8-2-16 (*Hacker*). One male. Very distinct among known males, and apparently not to be associated with any described female.

The males of this genus show remarkable differences. In such species as *E. nitida* the general appearance is more like that of a female; the face is not hairy, the eyes are not remarkable, and the legs present no unusual features. In contrast with this, *E. diversipes* has a narrow face with much long erect black hair, enormous eyes converging below, and greatly modified legs with slender femora. Such insects seem so far apart as to be hardly congeneric. *E. abstrusa*, however, is intermediate, and the females seem all to be strictly of one genus.

The above species of *Exoneura* may be separated by the following table. The distinction between those with red and black abdomen becomes obscure in certain members of this series, so in order to avoid any chance of error, I have repeated them under both categories:—

	Males	1.
	Females	5.
1.	Abdomen at least partly red	2.
	Abdomen black	3.
2.	Middle of face creamy-white	*perpensa* Ckll.
	Face black	*robusta* Ckll.
3.	Anterior tibiæ mainly pale red; clypeus and narrow lateral marks white	*abstrusa* Ckll.
	Anterior tibiæ dark	4.

4.	Face with long black hair	*diversipes* Ckll.
	Face without long hair	*nitida* Ckll.
5.	Abdomen bright red, with thin short orange hair on apical part	*bicolor* Smith.
	Abdomen dusky or dark red, or partly reddened	6.
	Abdomen black, or slightly reddened	10.
6.	Face concave, depressed, entirely black	*excavata* Ckll.
	Face not entirely black; if nearly all black, not concave	7.
7.	Face with lateral cream-coloured spots; abdomen very broad, reddish ..	*insularis* Ckll.
	Face without lateral spots	8.
8.	Clypeal mark broad, or with lateral hook-like extensions at upper end	9.
	Clypeal mark a simple narrow stripe, not always well defined	*baculifera* Ckll.
9.	Legs largely reddened; hook-like extensions of clypeal mark very long ..	*rhodoptera* Ckll.
	Legs black, at most knees reddish, or tibiæ and tarsi obscurely reddened; face-marks variable	*robusta* Ckll.
10.	Face with light lateral spots; flagellum pallid beneath	*insularis* Ckll.
	Face without light lateral spots	11.
11.	Face-mark a narrow subobsolete stripe	*baculifera* Ckll.
	Face-mark broad, or with lateral extensions above	12.
12.	Anterior and middle femora with a red stripe above	*rhodoptera* Ckll.
	Anterior and middle femora without such a stripe	13.
13.	Tubercles entirely black, densely fringed with grey hair	*robusta* Ckll.
	Tubercles largely light; legs black	*nitida* Ckll.

MELIPONIDÆ.

TRIGONA Jurine.

Trigona cassiæ Cockerell.

Workers from Brisbane, 8-2-16 (*Hacker*), and Caloundra, 20-1-16. (*Hacker*). One of the Brisbane specimens has a dark red abdomen, but it is certainly conspecific, and possibly not fully matured.

Trigona læviceps Smith.

Many years ago I recorded *Trigona canifrons* Smith from Adelaide R., Australia, basing my identification on comparison with specimens from Ceylon, received from Mr. E. E. Green as *canifrons.* Unfortunately the Ceylon specimens were really *T. læviceps* Sm., and not *canifrons* at all. A specimen now before me, from Gordonvale, N.Q., June, 1918, collected in the scrub by Edmund Jarvis, is identical with the so-called *canifrons* of Australia. I am quite unable to clearly separate it from *læviceps*, though it is rather slender, with the abdomen dark sepia-brown, becoming black apically. Possibly a larger series would indicate a distinct form, but I am inclined to think that we have the Indian *læviceps* probably accidentally introduced into Australia. Bingham states that it builds in crevices in the walls of houses, so it seems quite possible that a nest might be carried with some kind of merchandise. The red antennæ distinguish if from the allied and certainly native *T. carbonaria* Smith.

ON THE EMERGENCE OF TWO TUBE-DWELLING HOMOPTEROUS INSECTS.

By Henry Hacker, F.E.S.

(Plates XVII and XVIII).

PECTINARIOPHYES PECTINARIA Kirk.

A good account of the calcareous tubes made by this and an allied species, together with the curious nymphs that inhabit them, was given by F. Ratte,[1] in 1884; but the method of emergence was very briefly mentioned by this author. Kirkaldy[2] in 1906, placed these insects in the subfamily *Cercopinæ* and erected two new genera *Polychætophyes* and *Pectinariophyes* for their accommodation. Subsequently[3] he placed them in the subfamily *Machærotinæ.*

These calcareous tubes have been frequently observed by me, attached to small Eucalyptus saplings, and during the last two years I have included them amongst other studies in the life histories of Australian Homoptera. As far as I am aware the final ecdysis of these insects is not paralleled by that known of any other group. All the tubes seen, however, do not contain living nymphs, as those deserted in previous seasons, owing to their durable nature, remain on the twigs for an indefinite time. The empty tubes have a bleached appearance in comparison with those that are occupied. The occupied tubes contain a clear liquid, and in it the nymphs live submerged with their heads downwards. Their suctorial apparatus is inserted through a longitudinal slit on the inner side of the tube into the twig to which the tube is attached.

The first indication that the insect is about to emerge is the appearance of small bubbles at the mouth of the tube. This occurs in early spring, generally in the evening or at night. Viewed through a lens at this stage, the posterior end of the nymph is seen continually moving from side to side; this end protrudes for about a second, evidently to obtain a supply of air, and then retracts, after which fresh bubbles are blown; this renewing of the air supply takes place at intervals. The operation continues for about an hour, by which time a large mass of froth has been produced, covering the mouth of the tube and hanging over the side. When about to emerge, the nymph forces its way to the top of the tube, protruding its posterior end first until the legs have reached the lip. It then swings itself over, and with the head now upward it climbs down the outer side of the tube until it is merged into the froth which has accumulated on the lower side. There is constant movement inside the mass of froth caused by the insect getting out of its nymphal skin. The froth now gradually subsides; all movement has ceased, and the newly-emerged insect is seen clinging to the empty nymph skin, which in turn is clinging to the side of the tube.

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[1] Proc. Linn. Soc. N.S.W., Vol. IX, p. 1164, 1884.

[2] Bull. Haw. Sugar Plant. Exp. Sta. i, pp. 384-386, 1906.

[3] Bull. Haw. Sugar Plant. Exp. Sta. xii, p. 10, 1913.

The pale-yellow wingless insect remains quite motionless. After a short interval tiny tegmina and wingbuds begin to appear. These expand rapidly, and in half an hour from the time they were first seen are fully developed. While this growth develops, and for some time after, the wings hang down perpendicularly; they are then suddenly flexed once or twice, and closed to their normal roof-like position. At this stage, though rather soft, the insect is able to walk and jump, but if left undisturbed it will remain quietly on the twig until the next day.

The time occupied by the metamorphosis of this insect is about an hour, and the total period from the first appearance of the froth, about two hours. The capture of adult specimens by me, in September and January, proves that there are two broods a year.

POLYCHÆTOPHYES SERPULIDIA Kirk.

This insect occurs in the Brisbane district, but more sparingly than the previous species. The tubes differ from that species in their larger size, darker colour, and the transverse serrated lines, which give them a coarser texture. They are invariably attached to the twigs for their entire length, while in the previously mentioned species, the upper part of the tube is always bent out away from the twig. This causes a slight difference in the method of exit between the two species. When the froth is coming from the tube it often runs down the twig instead of the tube, dependent on the angle at which the twig is inclined. The emerging nymph following the froth consequently often clings to the twig instead of the tube to undergo its metamorphosis. When this occurs, the insect immediately after emergence generally walks a little way up the twig and there stops while its wings develop. In other respects its method of emergence is similar to that of *Pectinariophyes pectinaria*, and the time occupied is about the same.

F. Ratte remarks :—" In the dry parts of the interior it is probable that the water contained in these shells is resorted to for drinking by the ants so numerous in Australia, as if it was a speciality among the small homopterous insects to provide during their life for the Formicidæ." All the evidence which I have acquired in the coastal district is against the above opinion; no ants have been seen drinking the liquid, nor were any noticed in the vicinity of the tubes. It is well known that many Coccidæ, Membracidæ, &c., excrete liquids which are eagerly sought by ants. In return the Homoptera receive certain services from the ants, so the benefit is reciprocal; but in the case of these soft tube-dwelling nymphs it would be of no service to be robbed of their protective liquid, without which they would speedily perish.

REMARKS ON THE ILLUSTRATIONS.

(Plates XVII and XVIII.)

Pectinariophyes pectinaria Kirk.—Figs. 1, 2, 3, and the upper insect in fig. 4. *Polychætophyes serpulidia* Kirk.—Figs. 5, 6, 7, 8, and the lower insect in fig. 4. Figs. 1 and 5 show the first appearance of the nymphs of both species, while forcing their way, posterior ends first, out of their tubes. The next stage is shown at fig. 6, where the nymph is clinging to the twig, while its skin is about to split longitudinally up the back. In figs. 2 and 7, the upper portion of the insects are free, while they are supported by their lower parts which are still enclosed in the nymphal skins; the wings are seen beginning to develop. Figs. 3 and 8 show the fully developed insects resting in their characteristic positions. In fig. 8, a circular anal plate can be seen on the empty nymph skin; it is peculiar to this species, and is used by the nymph as an operculum to close the mouth of its tube.

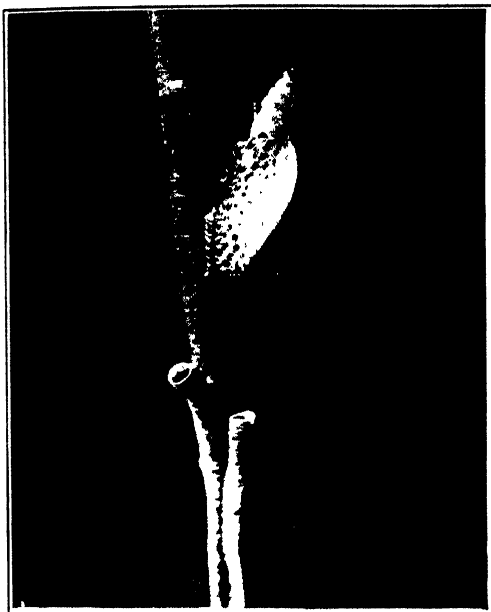

Fig 1 × 3 diam.

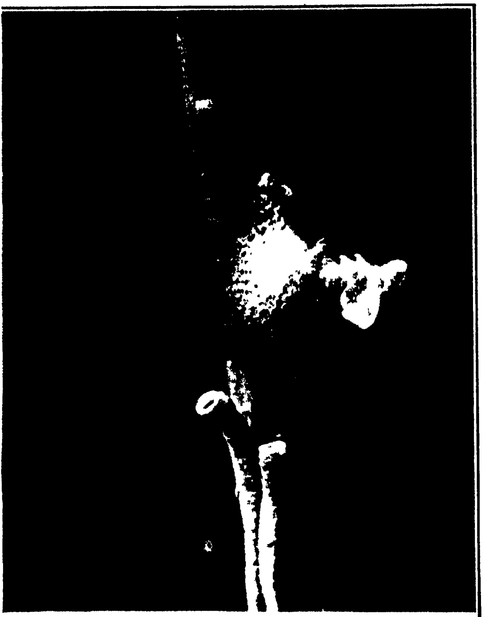

Fig. 2. × 3 diam.

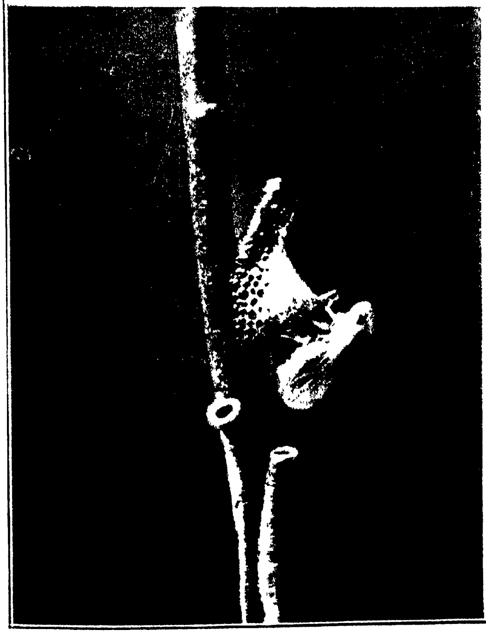

Fig 3. × 3 diam

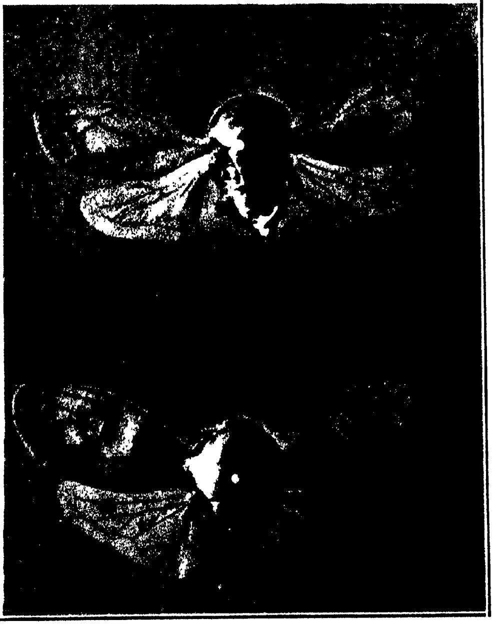

Fig 4 × 5½ diam.

Emergence of Tube-dwelling Homoptera, Hacker.

Face page 282.

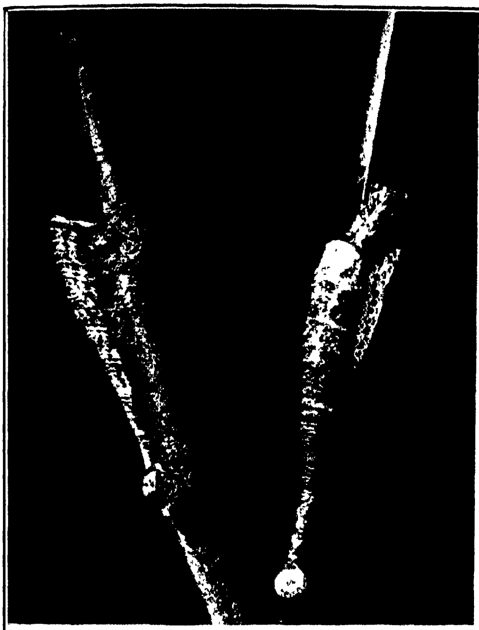

Fig 5. × 3 diam

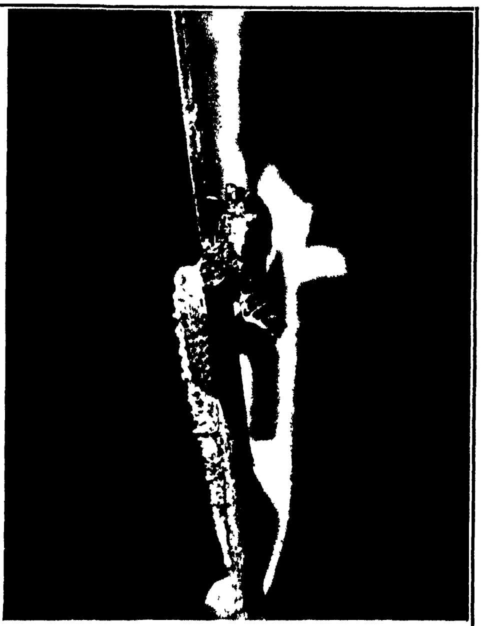

Fig 6 × 3 diam.

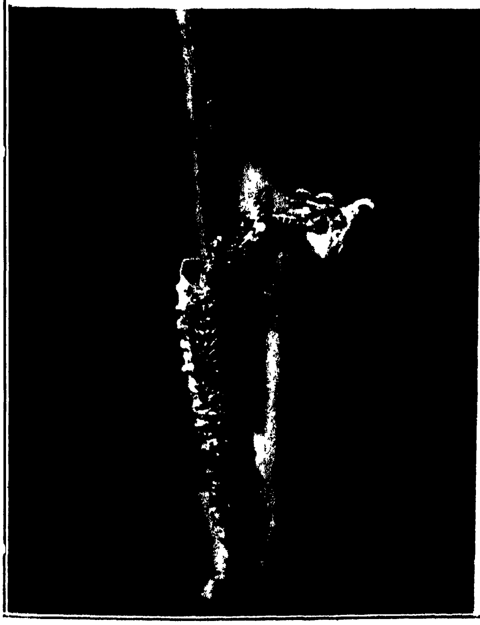

Fig 7. × 3 diam.

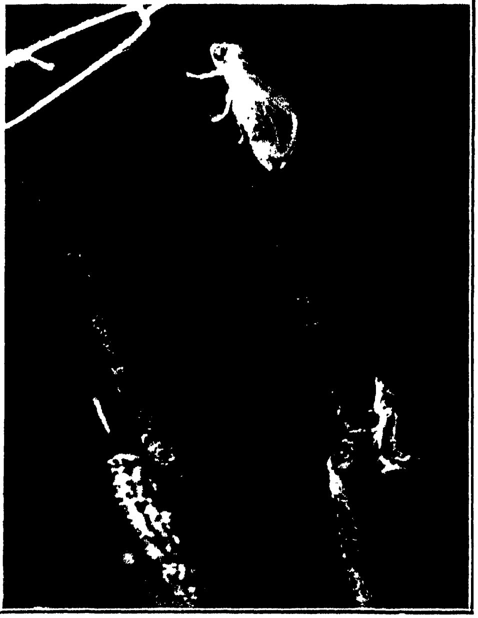

Fig 8. × 3 diam.

Emergence of Tube-dwelling Homoptera. Hacker.

Face page 282.

SOME AUSTRALIAN WASPS OF THE GENERA *ZOYPHIUM* AND *ARPACTUS*.

BY HENRY HACKER AND T. D. A. COCKERELL.

FAMILY CRABRONIDÆ.

SUBFAMILY PARANYSSONINÆ.

GENUS ZOPYHIUM Kohl.

The genus *Zoyphium* Kohl, based on a single species as recently as 1893, is now found to include a large number of Australian forms, presenting excellent specific characters. The following table separates those at present known, but it cannot be doubted that many others will be found when collectors in various parts of Australia interest themselves in these small wasps:—

	Females	1.
	Males	15.
	Two cubital cells in anterior wings	*frontale* Turner.
	Three cubital cells	1.
1.	First abdominal segment with a tooth or tubercle on each side	2.
	First segment without such teeth	3.
2.	Clypeus with two small teeth on each side	*sericeum* Kohl.
	Clypeus with one tooth on each side; first abdominal segment campanulate, not truncate, with a pair of basal keels, and a small tubercle on each side not far from base	*flavofasciatum* Turner.
3.	Abdomen black in middle and pallid at either end, its basal segment very short and broad, abruptly truncate; clypeus without lateral teeth	*dipteroides* Turner.
	Abdomen red in middle	4.
	Abdomen black, or with hind margins of segments more or less red	7.
4.	First abdominal segment black, with red hind margin; pronotum black; clypeus cream-colour	*ornatum* n. sp.
	First abdominal segment red	5.
5.	Upper margin of pronotum yellow, scutellum and postscutellum mainly red	*collare* n. sp.
	Pronotum black; scutellum and postscutellum without red	6.
	Mesonotum dark blue	*erythrosoma* Turner.
	Mesonotum black	*splendidum* n. sp.
7.	Pronotum with an interrupted cream-coloured band above; mesonotum faintly brassy, very finely and closely punctured	*funebre* Turner.
	Pronotum with upper margin wholly dark	8.
8.	Antennæ red or pale brownish	9.
	Antennæ wholly or mainly black	10.
9.	Legs bright yellow	*affine* n. sp.
	Legs pale ferruginous brown	*Kohlii* Turner.*

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* In his key, Turner says that ♀ *kohlii* has no clypeal teeth, but his descriptions indicate single short tooth on each side.

10.	Pronotum strongly emarginate in middle above	11.
	Pronotum not emarginate	12.
11.	Tibiæ entirely red	*emarginatum* n. sp.
	Tibiæ not red	*nigrum* n. sp.
12.	Legs mainly black, not red or yellow	*argyreum* n. sp.
	Legs red	13.
13.	Wings strongly dusky	*fuscipenne* n. sp.
	Wings clear hyaline	14.
14.	Face with golden hair	*crassicorne* Ckll.
	Face without golden hair	*iridipenne* Turner.
15.	(Males) Abdomen red	16.
	Abdomen pallid, with a broad median black band	*flavofasciatum* Turner.
	Abdomen black, or with hind margins of segments red	19.
16.	Very small, about 4 mm. long; upper margin of pronotum reddened	*pusillum* n. sp.
	Much larger; upper margin of pronotum not reddened	17.
17.	Mesonotum dark-blue	*erythrosoma* Turner.
	Mesonotum black	18.
18.	First abdominal segment black, with hind margin red	*ornatum* n. sp.
	First abdominal segment red	*splendidum* n. sp.
19.	Mesonotum red	*rufonigrum* Turner.
	Mesonotum black	20.
20.	Pronotum strongly emarginate in middle above	21.
	Pronotum not emarginate	22.
21.	Tibiæ entirely red	*emarginatum* n. sp.
	Tibiæ not red	*nigrum n. sp.*
22.	Legs bright ferruginous	*crassicorne* Ckll.
	Legs yellow	23.
23.	Front with silvery hair	*affine* n. sp.
	Front with golden hair	*doddi* Turner.

Z. rufipes Rohwer is omitted, as it is a *Sericophorus*.

The material of this genus in the Queensland Museum shows uniformity in most structural characters. Where these are very close, as between *Z. emarginatum* and *Z. nigrum* or *Z. erythrosoma* and *Z. splendidum*, there are well marked colour differences by which the forms may be easily separated. Colour characters seem constant and may be used with more confidence in this genus than in some others of the Crabronidæ.

In most of the species where both sexes are known, the females possess two pairs of teeth on the apical margin of the clypeus, while they are absent in the males. Several species of which but one sex is known are in agreement and may be included eventually in the above group. A few species, however, show a different arrangement. *Z. flavofasciatum* has one pair in each sex; *Z. argyreum* has one pair in the female; *Z. dipteroides* is said to be without teeth in the females. In a few males there is a slight angulation on the clypeal margin, but this is not considered to be within the meaning of the term "tooth."

ZOYPHIUM CRASSICORNE Ckll.

Female. Length 6 mm.; differs from the male in the colour of the clypeus, the basal half of which is blackish, with a pale ferruginous band along the apical margin; the apical edge has two small dark-coloured teeth close together on each side.

Hab.—Brisbane (*Hacker*), October and February.

ZOYPHIUM FLAVOFASCIATUM Turn.

Female. This sex differs from the male in its larger size, length 10½ mm. exp. 19 mm. The pygidial area is triangular, narrowly rounded at the apex, and clothed with short, stout hairs. It corresponds to the male in colours and markings, also in possessing a single tooth on either side of the apical margin of the clypeus.

Hab.—Brisbane (*Hacker*), November.

ZOYPHIUM EMARGINATUM new species.

Female. Length 8 mm. Head and thorax finely punctured, the entire face covered with brilliant silver pubescence ending abruptly, with rounded outline, at sides, a little above level of antennæ, but in certain lights the front also appears silvery; ocelli inserted in slight depressions, the posterior pair twice as far from each other as from the eyes; antennæ clavate, the apical joint large, obliquely truncated, the truncation excavated; sides of prothorax rather depressed, the central part produced with a large triangular emargination in the middle; the apical edge of the clypeus has two small teeth on each side. Median segment with a short longitudinal carina which ends in a somewhat circular shining depression; basal area with diagonal striæ which are strongest at the base; the posterior truncation is very finely punctured, the sides with silver pruinose pubescence. Dorsal abdominal segments very finely punctate, clothed with fine golden pruinose pubescence, sides of first segment silvery, the ventral segments smooth, shining, with a few scattered punctures, the apical edges thinly ciliate. Pygidial area reddish, triangular, flattened dorsally and broadly rounded apically. Second submarginal cell pointed on the radial nervure, receiving the second recurrent nervure at one-third from the apex; first recurrent nervure received at about the same distance from the first submarginal cell; posterior tibiæ with fine, short spines on the outer edge.

Black, mandibles at base, the first to fourth joints of all tarsi very pale flavus; enlarged apical tarsal joints, tibiæ, apex of anterior femora, intermediate and posterior femora except at base, light ferruginous; undersides of apical antennal joints bright ferruginous; apical bands of abdominal segments, testaceous; tegulæ rufous; pulvilli black; wings hyaline, slightly dusky, noticeably so at apex; iridescent, nervures and stigma dark-brown.

Male. Length 6 mm. Apical edge of clypeus without teeth; the triangular emargination in the middle of prothorax as in the female; apex of the last abdominal segment with two small projections at the sides, narrowly emarginate in the middle.

Hab.—Brisbane (*Hacker*), September, October.

ZOYPHIUM NIGRUM new species.

Female. Length 6 mm. Clypeus transverse, convex in the middle, the apical margin with two teeth on each side; clypeus and the lower half of face clothed with silver pubescence; ocelli nearly twice as far from eyes as the diameter of one; antennæ clavate, the fourth and following joints broader than long; apical joint large, obliquely truncated and excavated, not nearly so massive as in *Z. emarginatum*. Prothorax rather produced in the centre where it is triangularly emarginate; thorax and scutellum finely punctured; median segment finely diagonally striated, with a short longitudinal carina which ends in a shining circular depression, short white pubescence at the sides of segment. Abdomen finely punctured, clothed with thin white pubescence, the apical segment triangular, more coarsely punctured and covered with short grey hair; second submarginal very narrow on the radial nervure, receiving the second recurrent nervure past the middle, the first recurrent nervure is received at about the same distance from the first transverso-cubital nervure as the second recurrent is to the second transverso-cubital nervure.

Black, base of mandibles, part of tubercles, tibial spines, second, third, and fourth tarsal joints sordid white; tegulæ, tibiæ, first and fifth tarsal joints fuscous; antennæ largely ferruginous beneath; wings hyaline, iridescent, faintly dusky apically, nervures and stigma fuscous.

Male. Length 5 mm. Apical margin of clypeus without teeth; apical abdominal segment triangular, narrowly rounded at apex.

Hab.—Brisbane (*Hacker*), October. Caloundra (*Hacker*), September, on tree trunk.

ZOYPHIUM ARGYREUM, new species.

Female. Length 4½ mm. Clypeus transverse, the apical margin with one tooth on each side; face the same width on the vertex as on the clypeus, clothed with silver pubescence. Prothorax slightly produced in the middle, without an emargination, lined dorsally with silver pubescence. Mesonotum and scutellum finely punctured; median segment very finely diagonally striated, entirely clothed with silver pubescence, thickest at the sides; area with a longitudinal shining sulcus widened and rounded apically. Abdomen microscopically punctured and thinly clothed with whitish pubescence; pygidial area triangular, more coarsely punctured, and clothed with short dark hairs. Second recurrent nervure received about one-fifth from the base of the second submarginal cell; the first received at about an equal distance from the apex of the first submarginal cell.

Black, base of mandibles, the whole of the clypeus, underside of scape, tubercles, apex of anterior femora, anterior tibiæ, the spurs, and the tarsal joints sordid white. Mandibular teeth, a narrow line on the apical clypeal margin, tegulæ, an obscure apical band on first abdominal segment ferruginous, antennæ black, obscurely fulvous beneath; pulvilli black.

Hab.—Birkdale, near Brisbane (*Hacker*), February. At flowers of *Lomatia silaifolia* R.Br.

ZOYPHIUM COLLARE, new species.

Female. Length 8 mm. Head and thorax finely punctured; face narrower at vertex than at clypeus, clothed with silver pubescence which extends up the sides of the front; clypeus with two distinct teeth on each side; posterior ocelli closer to the eyes than the diameter of one; apical joint of antennæ not wider than the preceding joint; a deep foveolate groove at the base of the scutellum, anterior to which there is a transverse band of pale yellow pubescence; median segment finely punctate striate, with a shallow longitudinal sulcus containing a short carina; at its apical end there are a few transverse striæ in a depression surrounded by a kidney-shaped swelling. Abdomen finely punctured; apical segment with coarser punctures, and short reddish hair. Second submarginal cell pointed on the radial nervure, receiving the second recurrent nervure slightly beyond the middle.

Black, base of mandibles, clypeus, scape (except a pale red patch above) and thickened upper border of prothorax creamy-white; scutellum and post-scutellum rufescent; flagellum (except dusky apex), abdomen, femora, and tibiæ ferruginous; a large creamy-white shining space on apical part of anterior femora beneath; spurs whitish; tarsi pale reddish, with dark pulvilli; nervures and stigma fuscous.

Hab.—Birkdale, near Brisbane (*Hacker*), February. At flowers of *Lomatia silaifolia.*

ZOYPHIUM ORNATUM, new species.

Female. Length 8 mm. Face narrower at vertex than at clypeus, sides straight; clothed with silver pubescence; clypeus with two teeth on each side; posterior ocelli nearly twice as far from each other than from the eyes; apical joint of antennæ not wider than the preceding joint; mesonotum and scutellum opaque, finely and closely punctured; a deep foveolate transverse groove at the base of the scutellum with a little silver pubescence at each end; median segment dorsally diagonally striated, with a central longitudinal carina, which ends in a shallow shining sulcus; basal abdominal segments shining, minutely punctured; apical segments clothed with thin golden pubescence; pygidial area triangular, clothed with short hairs; second submarginal cell pointed on the radial nervure, receiving the second recurrent nervure well beyond the middle.

Black, base of mandibles, and clypeus creamy-white; scape and apex of femora, very extensive on anterior pair, pale yellow; tibiæ and tarsi pale reddish, the anterior tarsi with a yellow stripe; flagellum except dark apex, apical border of first, and all of the remaining abdominal segments ferruginous.

Male. Length 7 mm. Clypeus without teeth, black with a rather obscure yellow spot on each side near the middle; hypopygium ending in an acute spine, with an acute spine on either side; first abdominal segment, except the apical band, black, as in the female.

Hab.—Birkdale, near Brisbane (*Hacker*), February. At flowers of *Lomatia silaifolia.*

ZOYPHIUM PUSILLUM, new species.

Male. Length 4 mm. Clypeus wide, the margins somewhat sinuate, without teeth; face clothed with thin white pubescence; front rather prominent, convex, finely and closely punctured: joints of antennæ broader than long, the apical joint not wider than the preceding joint; ocelli not twice as far from each other than from the eyes; mesonotum and scutellum finely punctured; median segment finely diagonally striate-punctate with a longitudinal carina which ends in a shallow shining transverse crescent apically. Abdomen shining, minutely punctured, with thin pubescence on the apical segments; hypopygium truncate, with a small blunt apical spine, and one at each side near the apex. Second recurrent nervure received a little beyond the middle of the second submarginal cell, the first received a smaller distance from the apex of the first submarginal cell.

Black, base of mandibles, clypeus, and tarsal joints cream-colour, tegulæ testaceous; tubercles, upper border of prothorax, legs, and abdomen ferruginous; flagellum red, dusky above; wings hyaline, iridescent, slightly dusky apically, nervures brown.

Hab.—Brisbane (*Hacker*), October.

ZOYPHIUM SPLENDIDUM, new species.

Female. Length 9 mm. Head finely punctured, orbits converging above; ocelli half as far again from each other as from the eyes; joints of antennæ gradually increasing in size, apical joint conical, as long as the two previous joints; clypeus convex, porrect at the apex, with two teeth on each side; clypeus and face clothed with silver pubescence. Thorax opaque, very finely and closely punctured: prothorax rather narrow; depressed below the level of the mesonotum; a deep foveolate transverse groove at the base of the scutellum, and in front of it a line of white hair; median segment opaque with a few very short striæ at the base; a longitudinal carina lying in a shallow sulcus, extending to the end of the segment dorsally; the posterior truncation with thin white pubescence. Abdomen shining, microscopically punctured, the apical segments clothed with thin pale pubescence; the pygidial area triangular, with coarser punctures and short golden hair; second recurrent nervure received at rather more than one-third from the apex of the second submarginal cell, the first received a little further from the base of the first transverse cubital nervure.

Black, base of mandibles whitish; clypeus whitish in the centre, dusky at base and sides, scape dull yellowish-white: flagellum (somewhat darkened apically), entire abdomen, apex of femora, tibiæ, and tarsi ferruginous, the anterior tarsi paler; tegulæ and nervures fuscous.

Male. Length slightly over 6 mm. Clypeus black, apically porrect, armed with a stout spine; there is a short prominent keel above the antennæ; face clothed with short silver pubescence; hypopygium triangular, terminating in a spine, with a spine on either side near the apex. Scape darkly pallid at end.

Hab.—Brisbane (*Hacker*), February, March. On flowers of *Lomatia silaifolia.*

ZOYPHIUM AFFINE, new species.

Female. Length 6 mm. Clypeus transverse, rather narrow, the apical margin wtih two minute teeth on each side; the posterior ocelli a little nearer to the eyes than the diameter of one; face about two-thirds as wide at the vertex as at the clypeus, clothed with short silver pubescence, which also covers the front up to level of ocelli; mesonotum and scutellum subopaque, finely punctured; a deep transverse groove at the base of the scutellum; median segment with a central longitudinal carina lying in a shallow sulcus; area diagonally striated, the striæ most distinct on basal line and on the sides of sulcus; abdomen shining, microscopically punctured; pygidial area triangular, clothed with short black hair; intermediate and posterior tibiæ armed with a few short spines on the outer edge; second submarginal cell pointed on the radius, receiving the second recurrent nervure two-fifths from the apex; first recurrent nervure received at about the same distance from the apex of the first submarginal cell.

Black, base of mandibles, clypeus, scape, first joint of flagellum, and the anterior coxæ flavous; legs shining chrome-yellow; flagellum ferruginous; wings hyaline, iridescent, faintly dusky, nervures brown.

Male. Length 4 mm. Clypeus yellow, without teeth; face clothed with silver pubescence as in the female; hypopygium ferruginous, obtusely rounded at the apex, with an obtuse tubercle on each side.

Hab.—Brisbane (*Hacker*), February.

This species is very close structurally to *Z. crassicorne* Ckll., from which it may be separated by the silver (instead of golden) pubescence on face (golden in *crassicorne*), and the bright yellow clypeus in both sexes (pale ferruginous and dusky in *crassicorne*). It is also related to *Z. doddi* Turner.

ZOYPHIUM FUSCIPENNE, new species.

Female. Length about 7 mm. Closely related to *Z. iridipenne* Turner for which it was at first mistaken, but larger, and evidently distinct by the dusky, pale brown wings, those of *iridipenne* being clear. The stigma is dark-brown, while the nervures are pale-brown, not black. The second recurrent nervure is received at more than three-quarters from base of second submarginal cell. In other respects the insect agrees with Turner's description of *iridipenne*, but it should be stated that the abdomen is dusky red at apex, and the flagellum is brown beneath. The silvery hair on face and lower part of front is thin and not brilliant, its outline on the front is in the form of a very broad V.

Hab.—Wedge Island, Tasmania, 4-1-1914 (*G. H. Hardy*).

SUBFAMILY ARPACTINÆ.

ARPACTUS CRUCIGERA, new species.

Female. Length 9 mm. Head, thorax, and abdomen finely and closely punctured; eyes not convergent towards the clypeus; posterior ocelli a little further from each other than from the eyes; front and sides of face clothed with short golden hair; clypeus transverse, shallowly emarginate at the base, more sparsely punctured than the rest of the head, a transverse sulcus at the base of the scutellum coarsely longitudinally striated; scutellum large, oblong, the basal and apical sides parallel, finely punctured except a small bare part in the centre; basal area of median segment with coarse longitudinal striæ, which are slightly deflected at the boundary, but continue over the dorsal surface; sides of median segment with longitudinal striæ. First abdominal segment narrowed at the base, slightly constricted at the apex, and rather coarsely punctured, the third, fourth, and fifth segments clothed with light pubescence; pygidial area triangular, shining, and sparsely punctured. Fore tarsi with short weak cilia, intermediate tibiæ with two equal apical spines, hind tibiæ with a few minute spines. First, second, and third abscissæ of the radius of equal length.

Black; the two basal joints of the antennæ, clypeus, labrum, mandibles at base, broad upper margin of prothorax, tubercles, large wedge-shaped area on pleura, and a stripe on each side on the mesonotum, yellow; scutellum yellow at sides, leaving a large black triangle in the middle; postscutellum yellow with a black triangular mark in the centre, and separated from the median segment by a black line; the basal area is yellow very distinctly outlined on the sides with a black line, a central black stripe commencing at the postscutellum passes through the basal area and continues to the end of the median segment; this stripe and the line between the postscutellum and the basal area make a conspicuous black cross; sides of median segment yellow; the apical half and sides of first abdominal segment, apical margins of the remaining segments (narrowest on the second) yellow; antennæ and pygidial area ferruginous; the outer sides of anterior and intermediate tibiæ and tarsi yellow; the inner sides and the posterior legs ferruginous. Wings brownish hyaline, the radial all brown, stigma ferruginous, nervures dilute fuscous, tegulæ testaceous.

The venation resembles that of *A. rufomixtus* Turner, but the second recurrent nervure bulges more outwardly. The basal nervure meets the nervulus.

Hab.—Brisbane (*Hacker*), November.

ARPACTUS RUFOMIXTUS Turn.

Male. Length 7 mm. The underside of the scape is yellow, the clypeus is yellow with a narrow testaceous line on the apical edge; the face below insertion of antennæ is clothed with light silky hair; other markings as in the female.

Hab.—Enoggera, near Brisbane (*Hacker*). Both sexes bred from oval cocoons which were dug out of a sandy bank. This sex has not previously been described.

The use of *Arpactus* for these insects depends on the acceptance of the "Erlangen list." For the present we follow the usage of Turner, who revised the Australian species. The other alternative, following the laws of priority, would be according to Morice and Durrant *Ceropales* Latrielle, which is current for quite a different sort of insect, but Rohwer maintains *Ceropales* in the usual sense (J. Ac., Washington, vol. 10, p. 176).

JOHN GOULD'S NOTES FOR JOHN GILBERT.

The names of John Gould and John Gilbert are so closely associated with Australia that new records of their work are still of interest. Through the kindness of Mrs. Charles Coxen and Mr. H. C. Coxen, relatives of John Gould, a small bound volume of manuscript containing the instructions written by the great ornithologist for his enthusiastic collector, John Gilbert, has been given an honoured place among the historical documents in the Queensland Museum.

In clear and elegant writing the ardent wishes of the pioneer naturalist are set out. Although the notes were never intended for publication, it has been thought desirable to print them in their original condition, with a few obvious slips revised. These notes were evidently for Gilbert's use on his second visit to Australia, and were written over eighty years ago. A special and pathetic interest is attached to them because of John Gilbert's tragic death in Queensland at the hands of aborigines during the Leichhardt expedition to Port Essington in 1845. That story is too well known to need repetition, and the collector's lonely grave in the far North will always be sacred to the naturalists of Queensland.

The bracketed numbers in the text refer to a few explanatory notes which are given at the close.

NEW SOUTH WALES.

"Collect specimens of *all* kinds of kangaroos and other mammalia, with their crania; send, if possible, the nose, face, and the palms of the hands and feet of all kinds of the smaller animals in brine or spirits, and make notes of their colour, as also of the eyes with their dimensions.

"Three kinds of wallaby run in the brushes of Illawarra, viz., *Halmaturus* [1], *ualabatus*, *H. Tithys* (the common pademellan, a red-necked kind), and a nearly allied species called 'Pama' by the natives. Of this latter, which is very like *Derbyanus*, I wish as many specimens and crania as convenient, and also fine specimens, and particularly crania, of the two former.

"At Illawarra I also saw, but could not procure, a small mouse-like animal among the leaves on the hills. The *Halm. ruficollis* (Warroon of the natives) is also very abundant on the rise of the hills by the side of the bush road between Wollongong and Bongbong. This kangaroo, of which I want good specimens, and particularly a *skeleton of an adult male and crania of both sexes*, may be procured by paying a visit to Mr. Throsby, at Bongbong, who will send his Tommy or some other native out with you. Bongbong is near Berima and can be reached either by going in the mail cart from Sydney, or by walking over with native guides from Wollongong. The koala or monkey [2] is also common on this road, and in Throsby Park the grey magpie *Strepera*, which I want.

"Both the menura and the tallegalla are abundant in some parts of the Illawarra district, but they are scarce near Wollongong. . . . The nidification of menura [3], being of the utmost importance, you must not fail to gain every information from the natives as to the structure and situation of the nest, number of eggs, &c., &c. Offer high rewards for the eggs, but you need not spend time in trying to shoot the birds. The bell bird, *Orthonyx*, satin and catbirds, Ganggang parrot, large green pigeon (*magnifica*) columba, Phasianella, all breed in these brushes, and of all of which I want the eggs.

"When at Bongbong, the natives also told me of a large blue-grey kangaroo which they sometimes killed. I could never make out what it is unless it be *robustus*. Make enquiry.

"In all districts get rock kangaroos, if possible, and kangaroo rats.

"Be very particular in ascertaining if there is an emu inhabiting the brushes, of a small size and black. I saw the footsteps of an emu on the small island next Mosquito Island at the mouth of the Hunter, and from the character of the brush and the low swampy nature of the soil I should not be surprised if it prove to be the small species. The natives would probably throw some light on the subject. Baker's Island is close to Newcastle, on which lives a Mr. Baker (a gardener) and his sons; they would give you information.

"The great *Macropus laniger* [4] is also found on the plains; in all probability it might be got by getting to any of the out stations behind Port Philip. I found it both in S. Australia, near the Murray, and on the extensive plains of the lower Namoi, near Gundermein; it is also to be found still nearer the colony, both at the Peel towards New England and within twenty miles from Brezi on the river Mokai, northward of Liverpool Plains, and which could only, I think, be got from Brown's station, eighteen miles lower down the Mokai. *Robustus*, *frœnatus*, and *dorsalis* are also found at Brezi, but do not go purposely for these. The great walleroo could be procured by employing the Yarrundi natives (Coxen's). I found them on the hills in front of Mr. Coxen's house, and Natty pointed out a hill close to the cedar brush at the Liverpool Range where they are abundant. Should you visit the Upper Hunter district it would perhaps be well to spend a week in getting as many specimens of the walleroo as possible, always securing the services of Natty and Jemmy, my faithful companions. Mr. Coxen would doubtless lend you a horse and cart and send you and your traps to the range where you would take up your quarters under the very hills on which the animal is found. The rock kangaroo, of which I should like several specimens, is also abundant here. The brushes are not worth hunting for the birds.

"You will also in this district procure the rat kangaroo [5] with the long white tip to its tail—not the common one found about Yarrundi— but if you call Natty's attention to the one we so often saw on all the low grassy hills immediately adjoining the range he will recollect. I, unfortunately, did not obtain it.

"You will, of course, collect every species of *mammal* in all the districts you visit. Pray try to get a little mouse (somewhat larger than the common European one) with a short blunt head, and which Jemmy caught for me from a hole in the ground in the bush close to Mr. Coxen's garden gate at Yarrundi. There are six or eight opossums in this district, four of which are only found in the brushes. Be sure to get the large great brush opossum with short ear [6] found in the hollows of the trees.

"Be sure to get the opossums from Illawarra and, indeed, from every district. Ascertain also if those of the plains are not distinct from those of the brushes; as I found to be the case at the Liverpool Plains.

PORT STEPHENS.

"On the hills at the back of this place, and doubtless on the ranges at Moreton Bay, the beautiful *M. Parryii* is found, and probably *robustus* and other species. . . . Gain all possible information respecting the nidification of the *Cuculidæ*. Ascertain, if possible, what species lays the olive-brown eggs [7], by searching for the eggs in the body.

"Gain further information respecting the nidification and habits of *Centropus*, whether more than one species—the changes they undergo, and if the brown birds are the young, or if this style of colouring is sexual.

"Make every enquiry about *Pedionomus*; it will most probably be found on the open sterile plains of the interior of W. Australia.

"*Kangaroos from W. Australia.*—Gain every possible information respecting the group. Collect adult males and females, together with the young of every species, and, if practicable, ascertain the weight of each and the difference of the weight of the sexes. Procure also as many crania as possible, labelling each with the name of the species and the sex. Procure the wallaby from Garden and Rotnest Islands. Dissect as many females as you can and learn if the young are found in the uterus and pouch at the same time; state the size of the young in the pouch. Specimens and crania of *Gilbertii* [8] particularly wanted.

"Attend to the seals.

"For birds of Western Australia see the list; and of those marked with the greatest number of x's send as many as can be collected. Fine examples of the nests and eggs of all; and also duplicates of the eggs.

"As many fish from every part not only of New Holland, but the Cape, St. Jago, &c.

"Shells, as many as possible; see Mr. Cuming's directions.

"Of plants, some ornamental shrubs and pieces of bark for drawings.

"The beard of the *Pinna* from the Sound.

"Send all the sponges and corallines possible.

"Collect reptiles and insects.

"See after a second emu in W. Australia.

"Collect emus from every locality. Ascertain the sex and procure if possible adult birds.

"Eggs of *Leipoa* and *Megapodius* in brine or new preservative.

"Specimens and crania of all quadrupeds, great or small."

NOTES.

1. The genus *Halmaturus* is now usually incorporated with *Macropus*, although, apart from size, the persistence of the premolar in the smaller wallabies forms a useful distinction from the kangaroos (*Macropus sensu stricto*). Some of the large fossil macropods, however, have a persistent premolar. *Halmaturus* "*Tithys*"—*Macropus thetidis*. The "pama" or parma wallaby was described by Waterhouse in 1846 as *M. parma*.

2. The unsuitable term "monkey" for the koala or native bear was subsequently dropped.

3. Although Gould described from Dr. Ludwig Becker's notes the nest and habits of his *Menura victoriæ*, no account of the nidification of the closely-allied New South Wales bird appeared in his books.

4. *Macropus* "*laniger*" is better known as *M. rufus*, the red kangaroo. *Onychogale frænata* is the bridled wallaby, one of the nail-tailed group.

5. *Bettongia lesueuri.*—It may be noted that Gould wrote of the rat kangaroo and the kangaroo rat, and the confusion exists to-day; but the former, meaning rat-like kangaroo, is obviously the better term.

6. "The great brush opossum" is *Trichosurus caninus*, typically found in our "scrubs" or rain-forest, whilst *T. vulpecula* is characteristic of the open forest.

7. As noted by Gould in his Handbook, I, p. 624, the bronze cuckoo, *Lamprococcyx plagosus*, lays olive-brown eggs.

8. "Gilberti" evidently refers to *Potorous gilberti*, a rat kangaroo of Western Australia, named by Gould in 1841 in recognition of Gilbert's work.

It is impossible to read through these notes without feeling a touch of that enthusiasm with which John Gould inspired his able collector. The records of these two men stand out in the literature of Australian Natural History, and the writer considers it a privilege to be able to give some publicity to the interesting notes in this little volume.

HEBER A. LONGMAN.

NOTES ON THE FAT-TAILED MARSUPIAL MOUSE (*SMINTHOPSIS CRASSICAUDATA*).

By W. B. Alexander, M.A.

On 17th June, 1922, at Westwood, Central Queensland, I noticed my kitten carrying a small animal in its mouth which, when rescued, proved to be a male of this species. It was somewhat remarkable that it had been caught in the open paddock behind my house in broad daylight. Unfortunately, it had been killed before I rescued it.

A few evenings later the same kitten brought a live specimen into the sitting room and proceeded to play with it. Fortunately, I was able to rescue it before it had been injured, and, subsequently, I kept it alive in a small cage in my room for several weeks. As comparatively little seems to be on record concerning the habits of these small nocturnal marsupials, I have thought it worth while to describe the habits of this individual as far as I could observe them. Like the first specimen, it was an adult male.

The box in which I kept it was lined with rough sods of turf, and during the day it remained concealed amongst the grass. It did not attempt to burrow, but pulled down a few long pieces of grass in such a way as to construct a slight shelter over the hollow in which it slept. About dusk it came out and ran about in its box looking for food. Its progression was effected by a series of short runs, with pauses at short intervals, and it not infrequently made short leaps, springing off its hind legs. It was able to jump on to the edge of the box, a height of about six inches above the turf floor, when the cover was removed.

The cover was of wire-gauze, and when this was in place it not infrequently clambered about on it, hanging from the under surface.

At first it was completely nocturnal, but, after a time when it became tamer, it not infrequently moved about in the day-time, especially during a spell of cold weather when I was unable to find many insects for it and it was presumably hungry.

It readily devoured cockroaches, large moths, and spiders. The cockroaches and spiders were completely eaten, but the wings of the moths were left. It also greedily devoured the white grub of a scarabæid beetle, but did not touch a good-sized earthworm. When hungry it would eat a small amount of beef-fat, but evidently did not care for this diet.

When eating it sat up on its haunches holding the insect in one of its front paws and biting portions out of its victim apparently haphazard, and without first killing it.

Though it was provided with a small tin of water it was never seen to drink, and I do not think water can have been necessary to it. After it was tame I tried holding a little piece of sponge soaked in water and in milk just in front of it, but it would not drink, nor did it lick off drops of water which fell on its fur.

It cleaned its fur in the same manner as a cat, sitting up on its haunches and licking itself, licking its paws and passing them over its head and neck to clean those parts of its fur which were out of reach of its tongue.

Its ordinary call was a low chirrup, and it frequently uttered this sound in the evening when running about in its cage. It would generally make the sound from its hiding place whenever I chirped to it in the day-time. When the cat was playing with it, it uttered a much louder, shriller, chirping sound, but I am glad to say this terrified call was not heard again.

Owing to a scarcity of insects I one evening introduced into its cage a large crab-spider with a breadth of some five inches across the legs. The mouse had killed and eaten a smaller specimen of the same kind, measuring from three and a-half to four inches across, but next morning the large spider was still unharmed in the cage. I removed it and, on hunting for the mouse found it in its corner alive but shivering, the trembling being especially apparent in its tail. Next day it died, and I have little doubt that its death was caused by the poisonous bite of the spider.

I am indebted to Mr. H. A. Longman, Director of the Queensland Museum, for identifying the species.

SOUTH QUEENSLAND MARSUPIALS.

By Heber A. Longman, F.L.S., Director.

MACROPUS RUFICOLLIS Desm.

Although the pelts of *Macropus ruficollis* Desm. have been frequently noted by the writer during the large sales of marsupial skins in Brisbane, no specimens with definite Queensland localities were obtained until July last, when Mr. M. J. Colclough of our staff secured two males and two females at Mundubbera, Burnett District. This is the most northerly record for the species. Except for a reference in Ogilby's Catalogue* and a note by Lonnberg and Mjoberg of a skin from Tambourine Mountain†, there appear to have been no registrations of this large wallaby for Queensland.

A NEW MACROPOD.

Notwithstanding its proximity to Brisbane, Stradbroke Island in Moreton Bay has never been satisfactorily searched for its mammals. This large island, thirty-three miles in length and attaining a breadth of seven miles, has big areas which are very rarely visited. Although *Petauroides volans* and *Petaurus sp.* are reported, we have no records of other Phalangeridæ, but Mr. Roland Illidge notes‡ having seen the nest or "drey" of a ring-tailed opossum over forty years ago. Bandicoots (*Isoodon macrurus*) are common. Very large specimens of the great grey kangaroo (*Macropus giganteus*) are to be occasionally seen, and a common wallaby is *M. ualabatus* of the mainland. In the early days pelt-hunters took a heavy toll, but fortunately the island was recently added to the many reserves which have been proclaimed in Queensland.

Mr. Colclough remembers seeing many years ago numbers of what was known as the Red Stradbroke Wallaby, which then frequented the open forest and grasslands of this large island, occasionally being seen also on the sea shore. Unfortunately no specimens were secured for this Museum. Through the kindness of Mr. Thomas Welsby, of Amity Point, whose writings have added much to our knowledge of Moreton Bay, we received some time ago two heads, with perfect skulls, forepaws, and a pelt of this very elusive red wallaby. Later on we hope to secure, by special permit, additional material, but as it is obvious that this marsupial presents characteristics which make it distinct from described forms, a preliminary notice is here given.

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* J. Douglas Ogilby, Catal. Austr. Mamm. Austr., Mus., 1892, p. 56.

† Lonnberg and Mjoberg, Kungl. Sven. Vet. Ak. Hr., Bd. 52, 1915, p. 7.

‡ R. Illidge, Qld. Naturalist, III, No. 6, 1922, p. 109.

MACROPUS WELSBYI new species.

THE RED STRADBROKE WALLABY.

Size medium; general form robust; not slender. Colour remarkably uniform, agreeing best with the "orange-rufous" of Ridgeway's nomenclature (Plate IV. No. 13); this colour extends on the top and sides of the head to the region of the orbits, also on the sides and limbs, but is distinctly lighter on the ventral surfaces and base of tail (tail incomplete), and merges into brown on the forepaws. Fur fine and silky in texture; hairs on back fully 35 m.m. long, but with no outstanding longer hairs with special colour zones. The bases of the hairs are buff-coloured throughout. Top of muzzle grizzled. With the exception of a darker area below the eye, which merges towards the nasals into the grizzled appearance of the muzzle, there are no face-markings, and there is no indication of a white whisker stripe.

Rhinarium large and naked, the wide superior border of granulated area being almost straight, and in this respect corresponding closely with that of *ualabatus*. Ears oval, thick and muscular, 80 m.m. in length; thickly clothed externally with the uniform orange-rufous hairs; almost naked interiorly except for strong lateral tufts and a few scattered hairs.

Skull.—The type skull is from a specimen which is not fully mature. The third premolar and also m.p.^{4} (using Thomas's notation from the British Museum Catalogue) are still in place. The labial portion of p.^{4} has been exposed from the alveolus, and it is evident that this tooth is of the massive *ualabatus* type, with prominent vertical ridges, the length being 9 mm. The fourth true molar is only just beginning to emerge.

Facial axis short, 208. Premaxillæ short and upright, with the sutures only slightly oblique. Nasals parallel in region of premaxillæ, then gradually increasing in breadth to the fronto-maxillary suture; slightly emarginated in the sagittal line at the union with the frontals. No distinct postorbital processes, and no marked constriction, but supraorbital ridges prominent. Frontal region very slightly concave. Infraorbital foramina opening 9 mm. from orbit. Palatal openings oval, 11 mm. in length.

Front incisors placed vertically as in *ualabatus*; I.^{3} with the posterior segment slightly shorter than that anterior to the notch; p.^{3} oval, 7 mm. long. Measurements, basal length 110; greatest breadth 64; nasals: length 45, greatest breadth 15·5, central breadth 10; intertemporal breadth 18·5; palate length 70, breadth outside m.^{2} (perm. teeth) 34, inside m^2, 20; palatal foramina 6·5; diastema to p,m.^{4} 18; basi-cranial axis 35; basifacial axis 75; facial axis 208; Teeth, length of third incisor 7·5, length of p.^{4} (measured in alveolus) 9; length of m.^{1} — m.^{3} (permanent molars) 22.

To facilitate comparisons, these measurements have been taken on the lines of Thomas's Catalogue.

The narrower nasals (especially in their expanded region) are an outstanding feature when this skull is compared with a series of a dozen *ualabatus*. Both the internal and the external nares are relatively smaller in the island species. The palatal openings are smaller and the anterior foramina are narrower than in *ualabatus*, but these last two features are too variable to be of much value.

In colour *Macropus welsbyi* most nearly resembles the large kangaroo *M. antilopinus*, from the Coburg Peninsula. It is quite distinct from *M. ualabatus ingrami*, described by Thomas in 1908*, and from the North Queensland *M. ualabatus apicalis*.

Apart from cranial characteristics, the presence of these very handsome red wallabies has been so often vouched for by naturalists visiting Stradbroke that it is impossible to dismiss them as examples of erythrism. But for the fact that specimens of typical *ualabatus* are also found on Stradbroke, these uniformly-coloured wallabies might be considered a well-marked island variety of the common species.

MACROPUS AGILIS Gould.

It is somewhat of a surprise to receive from Stradbroke Island a large pelt, accompanied with a skull, of *Macropus agilis* Gould. This was secured in 1918 by Mr. Frank Day and Mr. Thomas Welsby at Wallin Creek, near Amity Point, Stradbroke. The Queensland Museum has a fair series of these large wallabies, but the previous most southerly record was Fitzroy River, "40 miles from Rockhampton," where the late Kendall Broadbent obtained six specimens in 1887. (This Fitzroy River must not be confounded with the West Australian Fitzroy.)

In 1910 E. Schwarz recognised four sub-species of *M. agilis* as follows:—*M. agilis*, Gould, *sensu stricto*, Arnhem Land; *M. agilis papuanus*, Ptrs and Doria, Southern Papua; *M. agilis jardinei* De Vis., Northern Queensland; *M. agilis aurescens* Schw., W. Kimberley, West Australia.†

In 1913 E. Lonnberg described *M. agilis nigrescens* as a fifth subspecies, the locality being Broome, North-west Australia.‡

The Stradbroke pelt agrees best with the large type specimen of *Macropus jardinei*, now somewhat faded, but it is decidedly lighter and only a very few long hairs with dark tips are present. It is probable that this is due to summer pelage. Considerable difference can be noted in a series of twenty specimens of Queensland *agilis,* and the amount of dark colouring is most variable The Stradbroke specimen is not so richly coloured as several of the northern examples. It represents a large male. No special characteristics can be found to differentiate the skull from those of northern specimens. A second skull, which is immature, has also been received from Stradbroke.

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* Oldfield Thomas P.Z.S., 1908 p. 732.

† E. Schwarz, Ann. Mag. Nat. Hist. (8), V. 1910, pp. 164-6.

‡ E. Lonnberg, Kungl. Sv. Vet. Ak. Hgr., Bd. 52, No. 1, 1913.

The following are the dimensions of the large Stradbroke skull, the corresponding figures for a Cardwell, North Queensland, specimen being given in parentheses:—Basal length 145 (142); greatest breadth 78 (81); nasals: length 66 (66); greatest breadth 22 (22); central breadth 16 (16); intertemporal constriction 16 (15); palate length 98 (100); breadth outside m.^{2} 45 (45), inside m.^{2} 29 (29); palatal foramina 9 (8); diastema 35 (33); basicranial axis 40 (38), basifacial axis 106 (107), basifacial index 265 (278); teeth, length of p^4 9·5 (10), length of m^1 — m^3 25·5 (26·5).

Mr. A. S. Le Souef, Director of the Zoological Gardens, Sydney, informs me in correspondence that he also has a pelt of *Macropus agilis* from Stradbroke Island.

THREE NEW QUEENSLAND FISHES.

By J. Douglas Ogilby.

FIERASFERIDÆ.

FIERASFER HOULTI sp. nov.

(Plate XIX, Fig. 1.)

Hump-backed Messmate.

Type locality.—Off Double Island Point, South Queensland.

Body deep, the dorsal contour strongly gibbous, much more so than that of the ventral, which is but little rounded, its greatest depth, which is well behind the small pectoral, 8·5 to 9·75 in the total length and about 1·22 in the length of the head, which is depressed, snake-like, and of sinister appearance, two and one-sixth times longer than wide, about equal to its distance from the origin of the dorsal, and 7·5 to 7·75 in the total length. Snout broad and obtuse, its length 4·25 to 4·75 in that of the head. Nostrils contiguous and valvular, the anterior much nearer to the tip of the snout than to the eye, the diameter of which is 4·5 to 5 in the length of the head. Interorbital space a little less than the snout. Upper jaw the longer, the cleft of the mouth extending backwards to beyond the eye, its length 2·2 in that of the head.

Teeth on the jaws small and conical, without canines either anteriorly or on the sides of the mandibles. Vomer with four strong, close-set, caninoid teeth, situated the one behind the other, the third from the front the largest.

Dorsal fin low, its distance from the tip of the snout 3·84 in the total length; caudal very small; anal much higher and more distinctly rayed than the dorsal; pectoral small but well developed, 3·5 in the length of the head.

Gill-openings well developed; united gill-membranes leaving fully half the isthmus uncovered. Vent situated rather in advance of the middle of the pectoral-base.

Grayish-brown, dotted with darker, the dots even encroaching upon the basal half of the pectoral.

The specimens here described, two in number and presumably an adult male and female, measuring respectively 283 and 236 mm., were trawled by Captain Hoult of the State Trawler Bar-ea-Mul, in 36 fathoms off Double

Island Point. They were, according to his statement, when caught, enclosed in the eviscerated remains of a holothurian, and were "very vicious" when shaken out on the deck. This species differs altogether in shape from *F. homei*, the great curvature of the dorsal profile rendering it much deeper than that fish. Reg. No. I. 3444–5.

TATHICARPUS APPELI sp. nov.

(Plate XIX, Fig. 2.)

SCRIBBLED ANGLER.

Type locality.—Wide Bay, South Queensland.

Depth of body 1·75 in its length. Caudal peduncle two-sevenths deeper than long, its depth 2·7 in the length of the head. Upper profile from the tip of the snout to the origin of the second dorsal gently rounded, but with a slight notch in front of the occipital spine. Width of the head slightly more than half its length, which is 1·8 in that of the body. Snout 5·33 in the length of the head and 2·25 in that of the maxillary. Diameter of eye equal to the length of the snout; interorbital width 1·2 in the eye-diameter. Maxillary extending to below the middle of the eye, its length 2·37 in that of the head, the width of its rounded distal extremity one half of the eye-diameter. Mental tubercle small.

Cutaneous appendages in small number, simple, longest on the chin, throat, and corner of the mouth.

Rostral spine and filament extending to the fourth dorsal ray, its length subequal to that of the head; frontal spine curved, its length 2·67 in that of the rostral, extending slightly beyond the origin of the occipital spine, its membrane reaching midway; occipital spine similar to but one-third longer than the frontal, bearing anteriorly a pair of long median filaments and subterminally a similar pair, one of which is posterior, its length rather less than half of the head, extending when depressed to third ray of the second dorsal, its membrane reaching about midway along the interdorsal space. Second dorsal with eleven rays, originating above the base of the pseudobrachium, its length subequal to its distance from the tip of the snout and 1·28 in the length of the head; outer border strongly convex, the fifth and sixth rays longest, 1·3 in the basal length; the depressed rays reach to the base of the caudal. Length of caudal fin 2·33 in that of the body. Anal fin with 7 rays, originating below the seventh dorsal ray, with sharply rounded outline, the third and fourth rays equal and longest, slightly less than the highest dorsal ray, rather more than twice the basal length, and extending well beyond the base of the caudal. Pectoral fin with seven rays, reaching slightly beyond the end of the anal-base, its length 1·95 in that of the body. Third ventral ray the longest, 2·4 in the length of the head.

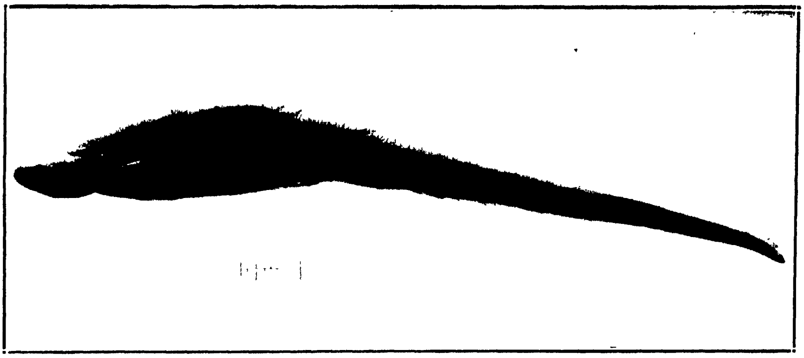

Fig. 1.— Fierasfer houlti, Ogilby.

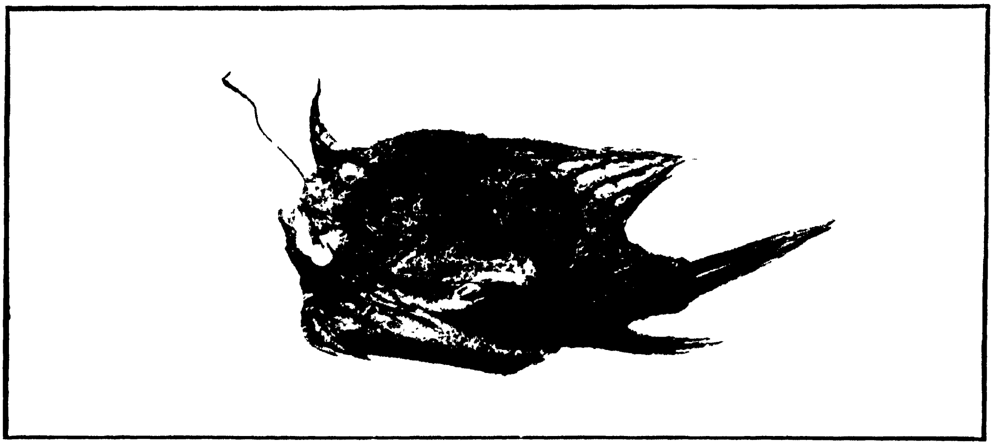

Fig. 2.—Tathicarpus appeli, Ogilby.

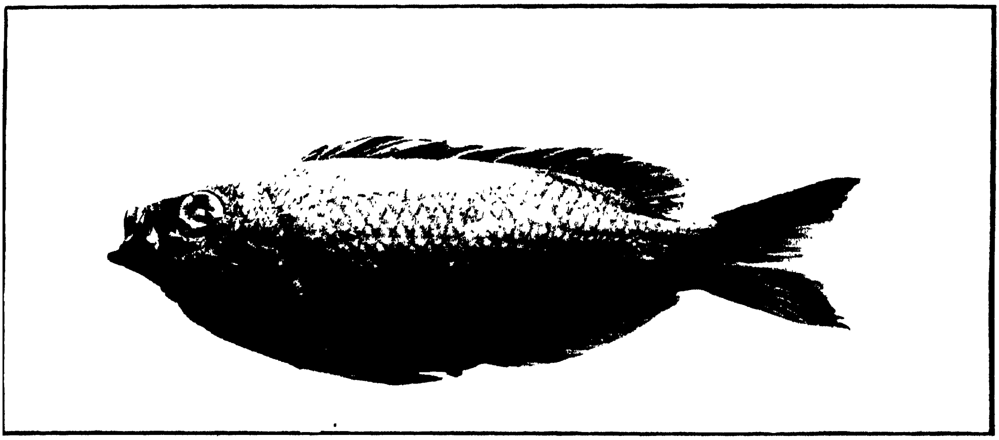

Fig. 3.—Chromis virescens, Ogilby.

Upper surface and sides pale brown, lower surface plumbeous, the whole densely spotted and streaked with black. Chin and maxillary grey, the former black dotted. Rostral spine and tentacle with alternating rings of black and white, the latter much the wider in the spinous portion; frontal and occipital spines and filaments blackish, the membranes hyaline; rays of soft dorsal pale brown, the membranes hyaline sparsely spotted with brown. Caudal similar to soft dorsal, the outer ray above and below with alternate lighter and darker rings. Anal rays blackish, the membranes hyaline, blotched and spotted with black. Upper edge of pseudobrachium like the sides, lower edge grey. Pectoral and ventral lavender, sparsely black-dotted.

Known only from the type, which measures 81 mm., and was presented to the Queensland Museum by Mr. F. G. M. Appel, who obtained it in Wide Bay. Reg. No. I. 3183.

POMACENTRIDÆ.

CHROMIS VIRESCENS sp. nov.

(Plate XIX, Fig. 3.)

GREEN PULLER.

Type locality.—Hervey Bay, South Queensland.

Body slender, its width 1·84 in its depth, which is 2·67 in its length and one-fourth more than the length of the head, the ventral contour more arched than the dorsal. Caudal peduncle a little longer than deep, its least depth 2·5 in the length of the head. Head about four-ninths deeper than wide, its fronto-occipital profile linear and but little acclivous, merging almost insensibly into the nuchal convexity, its width 1·22 in its length, which is 3·6 in that of the body. Snout pointed, 1·3 in the eye-diameter and 3·8 in the length of the head. Diameter of eye 2·85 in the same. Preorbital narrow, its width 2·5 in the eye diameter. Interorbital region moderate and convex, its width equal to or a little more than the eye. Nostril round, nearer to the eye than to the tip of the snout. Cleft of mouth subvertical, the angle not reaching lower border of the eye. Maxillary extending to below the nostril, its length 3·44 in that of the head. Preopercle rough but not serrated, the hinder border directed upwards and backwards; opercle with a single spine.

Teeth in the jaws short, blunt, and conical, in several series anteriorly, the outer row somewhat enlarged.

Scales along the middle of the body, from the opercle to the root of the caudal, 30; number of tubes on the lateral line 20 or 21; four scales on the cheek below the eye. Accessory scale of ventral long, 3·9 in the length of the head.

Dorsal with xiii. 13 rays, the spines of moderate strength, originating above the base of the pectoral, the last spine about one-third shorter than the longest, which is the fourth and 1·86 in the length of the head: soft dorsal low and rounded, the middle rays the longest, but little longer than the fourth spine, its length 1·83 in that of the body. Caudal forked, with 15 principal rays, 13 of which are divided, the middle rays 1·85 in the upper lobe, which is 3·4 in the length of the body. Anal with ii. 13 rays, the second spine the longest, one-third of the length of the head and 1·25 in the longest ray; length of anal about equal to that of the head. Pectoral pointed, with 16 rays, the length 1·37 in that of the head. Ventral spine about five-eighths of the first ray which is as long as the pectoral.

Gill-rakers 17 on the lower branch of the anterior arch, the longest half of the eye-diameter.

Dark-greenish, shading to slightly lighter below; a small round black spot at the axil.

Four examples of this fish were caught in Hervey Bay by the State Trawler, and sent to the Museum by Captain Hoult They differ from the Southern *C. hypsilepis* in the more slender habit, the shape of the soft dorsal and anal, the presence of a small axillary spot, and the absence of a whitish spot on the peduncle. The illustration, I 3477, is of the natural size.

[*END OF* VOL. VII, *MEMOIRS OF THE QUEENSLAND MUSEUM.*

ANTHONY JAMES CUMMING, Government Printer, Brisbane.

MEMOIRS

OF THE

QUEENSLAND MUSEUM.

VOL. VIII.

With Forty-three Plates and Twenty-three Text-figures.

Edited by the Director,
HEBER A. LONGMAN.

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THE ZOOGEOGRAPHY OF MARSUPIALS,

WITH NOTES ON THE ORIGIN OF THE AUSTRALIAN FAUNA.

BY HEBER A. LONGMAN, F.L.S., DIRECTOR, QUEENSLAND MUSEUM.

NOTWITHSTANDING the wealth of literature on the subject, the problem of the origin of our Australian marsupial fauna is still a fascinating field for research. It is almost with trepidation that the writer enters this arena of controversy, wherein so many able authorities have expressed diverse views. None the less, it seems desirable to try and focus the results of some of our more recently acquired knowledge, together with a purview of the work of the past, so far as space and opportunity permit.

For the sake of consecutiveness it is necessary to set out, by means of extracts, some of the views of authorities. In 1893 H. O. Forbes published a formidable list of vertebrates (the majority being birds), invertebrates, and plants chiefly confined to the southern hemisphere suggesting affinities between South America, Australia, various Pacific Islands, and South Africa, from which he deduced the existence of a former circumpolar continent. When analysed to-day, however, many of the examples quoted by Forbes, with reference to Australia and South America, have lost their significance, and any affinities that remain do not afford evidence of lineal relationships requiring southern Tertiary land bridges.

In 1892 Baldwin Spencer accepted the north-western origin in pre-Cretaceous time of the monotremes and the primitive polyprotodont fauna (p. 116), spreading south and then east. Later, in his valuable summary of the results of the Horn Expedition (1896), Spencer considered that the northern origin of marsupials was practically negatived by the feeble development of the more primitive polyprotodonts in north-eastern Australia (p. 185), although he believed that the characteristic Diprotodonts had mainly developed there. He considered that Papua was the last and not the first land of the Australian region to be reached by the marsupial fauna.

Haswell (1914), in his interesting review of the Australian fauna, considers (p. 217) the connection between Australia and South America "at some time antecedent to the Pliocene" to be clearly established.

In several papers (1893, 1895, 1899, and 1912) Hedley has argued for the Antarctic origin of our most characteristic fauna, and his advocacy carries weight.

Hedley (1899) wrote of "a rich fauna of Antarctic origin, which, entering by Tasmania, overran the whole continent, crossed Torres Strait into New

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NOTE—The substance of this paper was given before the Zoology Section of the Pan-Pacific Conference in Sydney, August, 1923.

Guinea, and reached its utmost eastern limit in the Solomons. Characteristic members of it are the marsupials, monotremes, cystignathous frogs, venomous snakes, and snails of the Order Macroogna." Using Tate's term, he calls this the Euronotian element, and claims it as the most characteristic fauna. In his address to the Linnean Society of London in 1912, Hedley states: "In Australia marsupials and monotremes are least developed in the North; proceeding southward more groups successively appear till ultimately Tasmania has, as Professor Spencer expressed it, 'a condensation of most that is noteworthy in the Australian Region.'" This aspect of the Antarctic theory appears to the writer to be open to adverse criticism. It is advisable to analyse first living species of Polyprotodontia.

Dasyuridæ.—The supposed paucity of polyprotodont forms in Papua and north-eastern Queensland must be examined in the light of recent work, which has greatly increased our knowledge of the range of present-day and fossil marsupials. In this "Papuan" (Hedley) or "Torresian" (Spencer) sub-region, we find *Dasyurus maculatus*, *geoffroyi*, *gracilis*, *hallucatus*, *albopunctatus*, and *dæmonellus* (Thomas, 1904), the last two species being Papuan, and there is a doubtful record of *viverrinus* for Queensland in our State Museum. The known species are found to be very strongly represented in north-eastern Australia. In the genus *Phascogale* we find that the following species (subspecies omitted), have been described from the Torresian region during the last twenty years or so:—*lorentzii*, *nouhuyou*, *naso* (three species from Dutch Papua, described by Jentink in 1911), *murex* O. Thos., 1913 (Papua), *melanura* O. Thos., 1912 (Papua); *bella* O. Thos., 1904, *mimulus* O. Thos., 1906, and *ingrami*, O. Thos., 1906, are Northern Territory species; *godmani* O. Thos., 1923, comes from North Queensland. When these records are added to previous ones, the great majority of species of *Phascogale* are seen to be in the northern region. It is somewhat surprising to find that the known distribution of the allied genus *Sminthopsis* has been much more restricted, although the majority of the species now described are found in the northern region, and *S. rufigenis* was recorded for the Aru Islands in 1922 by Oldfield Thomas. When genera and species are considered, taking fossil as well as present-day forms, it is found that, instead of the polyprotodont marsupials being feebly developed in the northern region, it is there that they are most strongly represented.

In the opinion of Bensley (1903) and of Gregory (1920, p. 159), *Myrmecobius* is a specialised dasyurid. Wood Jones (1923, p. 126) has remarked that it is greatly handicapped by its habits: "It does not excavate deep burrows, it does not climb, it is not fleet of foot." The gradual restriction of its range in recent years suggests a far wider distribution in the past.

Peramelidæ.—During recent years we have added greatly to our knowledge of the Peramelidæ. In 1909 Allen and Barbour (*loc. cit.*) described the new genus *Suillomeles* for a species (*hispida*) from Dutch Papua. In 1920 the genus *Rhynchomeles* was established by Oldfield Thomas for a species (*prattorum*) found in Ceram. The genera *Echymipera* and *Peroryctes*, now separated from *Perameles* and *Isoodon*, are distinctively Papuan. The writer has no knowledge of the characters of *Anuromeles*, Heller (1897), from Papua.

In 1903 Bensley pointed out that " Of the Peramelidæ all the species representing prototypal forms are Papuan " (p. 204). In 1923, with the addition of new genera and species the range and diversity of the Peramelidæ are far more significant. It now appears to be definitely established that the radiation of the Australian forms emanated from Papua, *Thylacomys* and *Chœropus* being specialised offshoots.

The discovery of new northern genera of peramelids is also of special interest in view of Osgood's opinion that this family exhibits characters suggestive of the incipient stages leading from polyprotodont to diprotodont groups. This is strengthened by their common syndactylism.

Osgood also states (1922, p. 135) that " the conclusion is unavoidable that among living forms those most suggestive of what the ancestor of *Cœnolestes* and other diprotodonts was like, are the Peramelidæ."

T. Thomson Flynn's recent work on the placenta in *Perameles* (1923), in which the genus is stated to be " a most primitive form " in this respect (p. 173), must be noted here.

Notoryctidæ.—The description of *Notoryctes caurinus*, by Oldfield Thomas in 1920, from Wollal, North-west Australia, makes an interesting northern extension of this curious marsupial, which is evidently a " specialised dasyurid."

Diprotodontia.—It is of interest to note a few of the more recent records for existing diprotodont marsupials. Taking the *Phalangeridæ* first, we find that no less than twelve out of twenty species of *Pseudochirus* occur in Papua, whilst the remaining Australian species are so richly represented in the north that the dominance of the genus there is undoubted. *Dactylopsila* (with eight species), *Dactylonax* and *Distœchurus* are distinctly Papuan genera, whilst *Acrobates*, *Petaurus*, *Eudromicia* (Mjoberg, 1915), and *Dromicia* are represented. *Phalanger*, including *Ceonix* and *Wyulda* (Alexander, 1918) has a remarkable distribution, ranging from Celebes to San Christoval in the Solomon Islands, from Talaut through the Moluccas, Timor, Papua, and New Britain, the Arus to North Queensland and North-west Australia, with twelve species. This wide-spread distribution affords striking evidence of northern marsupial extension, especially in view of the fact, mentioned by Guppy (1887), that cuscus are preyed upon by dogs which attack them when they descend at nightfall. The genera of the Phalangeridæ are thus seen to be overwhelmingly represented in northern regions.

Of the macropods, *Dendrolagus*, *Dorcopsis*, and *Dorcopsulus* are obviously Papuan. *Hypsiprymnodon*, an annectant type, is confined to North Queensland. The genera *Petrogale*, *Lagorchestes*, *Æpyprymnus*, and *Onychogale* are represented in the northern State. *Macropus* has a still wider range to Papua, New Britain, and the Aru Islands, but it seems clear that the evolution of the characteristic saltatorial forms, represented by this genus, has taken place mainly in the plains and forests of the Australian mainland. But, as in other families, the majority of the macropodian genera are to be found in the Torresian region.

When fossil representatives are considered, species of *Phascolomys* are more numerously represented in northern than in southern Australia.

Tasmanian Fauna.—With the possible exception of *Wynyardia bassiana* Spencer, dealt with elsewhere, the marsupial fauna of Tasmania presents no species, neither living nor fossil, that cannot be readily conceived as derivable from mainland forms. With the palæontological evidence for *Sarcophilus* and *Thylacinus* in Queensland, this is surely clear. In the list published by Clive E. Lord in 1918, twenty species are mentioned. Of these, one, *Petaurus breviceps*, is an artificial introduction from the mainland; there are three varieties of mainland forms (*Trichosurus vulpecula* var. *fuliginosus*, *Macropus ruficollis* var. *bennetti* and *M. giganteus* var. *fuliginosus*); no less than ten are found on the mainland (*Sminthopsis leucopus*, *Phascogale swainsoni*, *Dasyurus viverrinus*, *D. maculatus*, *Perameles gunni*, *P. obesula*, *Petaurus breviceps*, *Dromicia nana*, *Potorous tridactylus*, and *Macropus billardieri*); the remaining seven are confined to Tasmania (*Phascogale minima*, *Sarcophilus ursinus*, *Thylacinus cynocephalus*, *Phascolomys ursinus*, *Pseudochirus* "*cooki*," *Dromicia lepida*, and *Bettongia cuniculus*). The present evidence of the marsupial fauna of Tasmania is decidedly in favour of the northern and not the southern origin of the group.

Syndactylism.—In 1923 Wood Jones analysed the relative age values of dental and pedal characters in classifying marsupials. After pointing out that the primitive marsupials were undoubtedly polyprotodont and didactylous, he shows that syndactylism must be a more primitive feature than diprotodontism because it is common to both groups; from a polyprotodont stock a syndactylous section arose which split up into the diprotodont group of herbivorous marsupials, on the one hand, and into the polyprotodont peramelids, on the other, the still more primitive didactylous dasyurids remaining unchanged. As it seems most improbable that this distinctive syndactylism could have been independently acquired, it is almost certain that this pedal character is one of greater antiquity than the specialised development of two front lower incisors, so characteristic of our dominant group. Syndactylism is thus a distinctive character of Australian marsupials, and it has apparently been developed here. It is absent in *Cœnolestes* and in all other American marsupials, although in *Marmosa pusilla*, figured by Bensley (Plate VII, fig. 7), there is "an indication of the syndactylous condition of the Phalangeridæ" (p. 191). It is very doubtful, however, whether this approximation of the second and third digits in some species of *Marmosa* can be compared with the well-marked and dominant syndactylism of Australian groups. It is remarkable that in the illustration of *Marmosa pusilla* given by Oldfield Thomas (Pl. XXVIII, fig. 1) there is no trace of syndactylism. In specimens of *Marmosa mitis* (O. Bangs, 1898) in the Queensland Museum, examined by the writer, there is no evidence of syndactylism, which does not appear to be even a specific character in the genus. The *M. pusilla* of the British Museum Catalogue is apparently referable to the nearly-allied *M. marica* O. Thomas, 1898.

Fossil Marsupials.—In tabulating evidence as to the origin of our marsupials, it is obvious that the index afforded by fossil genera and species is of even greater value than that of existing representatives. It appears to be an outstanding fact that *our fossil marsupial fauna is much more distinctively Australian than that of to-day.* We have ample evidence of gigantic specialised marsupials, such as *Diprotodon, Nototherium, Euryzygoma, Phascolonus, Sthenurus, Palorchestes, Procoptodon,* and *Thylacoleo.* There is no evidence whatever for the derivation of these specialised genera from either living or fossil American forms.

It is also very obvious that the genera existing to-day were much more richly represented in the past. The numerous species of Macropus (*sensu lato*) included very large forms, such as *M. anak*, whose trenchant premolar relatively dwarfs that of the Papuan *Dorcopsis.* The wombats of to-day are but a few survivors compared with their Pleistocene predecessors, which ranged from Clermont (Longman, 1917) to Western Australia. The carnivorous extinct *Thylacoleo carnifex* had for associates in Queensland species of *Sarcophilus* and *Thylacinus*, which were larger than Tasmanian species of to-day. A mandibular fragment of *Sarcophilus* was recorded from Rockhampton by the writer in 1921, this being an addition to the many records of the Queensland "devil" on the Darling Downs. The same species has been noted for Western Australia by L. Glauert, who has also recorded the following genera from his field:—*Diprotodon, Nototherium, Phascolonus, Phascolomys, Macropus, Sthenurus, Bettongia, Perameles, Thalacomys, Dasyurus, Thylacinus,* and *Thylacoleo.* Scott and Lord have published records in Tasmania of *Diprotodon, Nototherium, Palorchestes, Sthenurus,* and *Macropus.*

This wealth of widely spread fauna surely demonstrates that our marsupials have been long in the land. Bensley (1903, pp. 206-207) expressed the view that the lowest estimate of the duration of the evolution of the Australian marsupials is still much too large, and he thought it unlikely that "the marsupial radiation could have begun until well on into the middle of the Tertiary period." But Bensley's elaborate review dealt mainly with existing species, and he does not appear to have fully appreciated the wealth and divergencies of our fossil forms. It seems far more probable that Osgood is correct when he says (1921, p. 131) "the view that all living families of marsupials were well differentiated early in the Tertiary seems to be well founded." In the clash of conflicting views as to the age of marsupials in Australia, it is difficult to obtain a proper perspective. No one, however, can carefully examine a large and comprehensive collection of our fossils without recognising that they represent an assemblage resulting from a lengthy process of evolution, which, in the great majority of genera, cannot be associated with any forms yet found outside the Australian regions.

The many changes that have taken place in land masses of the Australian region since Cretaceous times, as outlined by Jensen and others, cannot be dealt with here, but it is evident that a variety of environments was available for the evolution of our marsupials from remote ancestors which were northern in origin.

Myrmecoboides.—Special interest has been attached to the presence of *Myrmecoboides*, with supposed peramelid affinities in the Paleocene of Fort Union, North America. Gidley's notable work on this fragment (an incomplete ramus of a lower jaw) perforcedly deals mainly with dental characters. The resemblances to *Myrmecobius* are very suggestive, but are not conclusive, and may be the result of convergence. Gidley (1915) notes that the name *Myrmecoboides* was given on account of its likeness to *Myrmecobius* rather than as a positive assumption of real relationship. He does not accept Osborn's or Bensley's view concerning the phylogeny of modern families of marsupials, and assumes "a vastly more ancient origin" than has hitherto been held for them. He states: "In fact, it seems reasonable to assume that at present nothing is definitely known regarding the origin of several of the living families of marsupials, including probably all the diprotodonts, because they are not represented in our collections from beds older than the Pleistocene, and that in the lower fossils we have only an incomplete and indefinite history of the origin and development of a part only of the polyprotodonts" (p. 401).

Osgood (1921, p. 140) states: "The hypothesis can scarcely be avoided that, provided *Myrmecoboides* is a marsupial, it may well be ancestral to the cænolestids."

South American Fossils.—The Sparassodontia of Ameghino from the Miocene of Patagonia are placed by W T. Sinclair in the Family Thylacinidæ. But it is significant that in *Borhyæna* the canine is actually replaced and in *Prothylacinus* the canine and two premolars are replaced. This marked tendency to a diphyodont dentition is unparalleled in Australian forms. Palatal vacuities and epipubic bones are lacking, and R. Lydekker, in 1907, in analysing these and other features, expressed the opinion that the Patagonian fossils were Creodonts and not marsupials. W. K. Gregory (1910, p. 207) states that these fossils show "a remarkable series of resemblances in general proportions and dental characters to some of the Creodonts among Placentals. . . . . The family Thylacinidæ is thus seen to be a specialized offshoot either of very primitive Dasyuridæ or more directly from the Didelphiidæ."

Gidley (1915, p. 401) points out that in the Miocene the Thylacinidæ had reached almost their present state of specialization. They certainly do not represent a primitive type suggesting an ancestral source for Australian forms. Tate Regan (1914) adversely criticises the suggested relationship between the two groups.

It is by no means improbable that the resemblances between the Patagonian fossils and *Thylacinus* are due to convergence. But even if the lineal relationship were definitely proved, which Sinclair does not suggest, the South American origin of our Diprotodontia would still be without a satisfactory basis.

The position of the remarkable American marsupial *Cænolestes* has been discussed in great detail by several authors, and it has been placed in no less than three sub-orders. Whilst many of its characters suggest that it may represent a prototypical generalized form, from the ancestors of which diprotodonts may have been derived, it seems to the writer that far weightier evidence is required before we associate the varied and manifold Diprotodontia of Australia with this marsupial from the Andes.

Among the many interesting points raised by Osgood in his elaborate memoir on *Cænolestes* is the fossil evidence that the diprotodont dentition of the cænolestid group goes back far in geological time, "perhaps in the Mesozoic," as the didelphids and cænolestids were already well distinguished in the Patagonian Miocene (Osgood, 1921, p. 129). Among his conclusions he states: "The ancestor of the cænolestids was probably a northern form which had already separated from the generalized polyprotodont stock. . . . The North American ancestor of the cænolestids possibly extended throughout Holarctica and therefore may also have given rise to the Australian diprotodonts. This assumes that the main lines of divergence between Diprotodonts and Polyprotodonts were established in the north prior to the Australian and South American radiations. Hence an Antarctic land connection is not necessary to explain the resemblances between American and Australian marsupials" (p. 151).

W. K. Gregory (1910) points out that the pes is "entirely eleutherodactylous," and he is inclined to regard *Cænolestes* and its allies as an independent sub-order, an offshoot of primitive Polyprotodonts, which has paralleled the Diprotodonts in certain characters of the dentition" (p. 211).

Gidley (1915, p. 401) states that the Cænolestidæ "more probably belongs with the Polyprotodonts."

In his analyses of the affinities of *Cænolestes* in 1911, R. Broom considers that it "was much more nearly allied to the American Polyprotodonts than to the Australian Diprotodonts" (p. 315).

Assuming that Wood Jones's argument for the special primitiveness of syndactylism is correct, the fact that modern cænolestids are diadactyl is an important point. It is also significant that a diprotodont dentition has independently appeared in several orders. It seems most probable that the resemblances between cænolestids and Australian diprotodonts are mainly due to convergence, but partly patterned by remote ancestral inheritance. There is now manifold evidence for the phenomena of convergence in obviously unrelated orders; it may be urged, *a fortiori*, that convergence is still more likely to appear in groups distantly related owing to the working out of similar ancestral potentialities.

Gregory (1910, pp. 212-213) writes: "Marsupials in general, and especially South American families of many orders, seem to abound in examples of homoplastic and convergent resemblances to animals of other orders."

Ameghino, who has described so many of the South American fossils, necessarily relies mainly on dental characters. In his phylogenetic diagram of diprotodonts (1903, p. 188) he derives his Hypsiprymnoidea (" *diprotodontes australianos* ") from the ancestral Garzonidæ through the primitive Cænolestidæ. After referring to the affinities of northern forms of Multituberculates with Patagonian fossils, he says : " Además, la transición entre los paucituberculados de la Argentina (Epanorthidæ, Cænolestidæ), y los diprotodontes actuales de Australia, es igualmente tan completa, que ya no es discutible la conclusión de que todos en conjunto constituyen un solo gran grupo." But the unitary grouping of the Cænolestidæ and Diprotodontia is not accepted by many authorities, and it seems a colossal assumption to derive the varied families and genera represented in Australia from the American species.

Wynyardia.—Baldwin Spencer's description of *Wynyardia bassiana* (1900) forms a notable contribution to the records of Australian vertebrate fossils. These remains, which have been attributed to the Eocene, were unaccompanied by teeth, but the describer instituted a large number of comparisons, based on available characters, and came to the conclusion that *Wynyardia* represented a form distinct from present marsupials, but allied to both existing Polyprotodontia and Diprotodontia. Osgood (1921) has criticised the diagnostic value of many of the characters set out by Spencer in his comprehensive analysis, but, whilst agreeing with the view that *Wynyardia* combines many features of the two groups, classifies it with the diprotodonts and makes it the type of a new family—*Wynyardiidæ*. He then compares this fossil with *Cænolestes*, as suggested by Gregory in 1910.

It appears to the writer that *Wynyardia* has no real relationship with *Cænolestes*, and that the differences are far more marked than the eight resemblances noted by Osgood (p. 139). The proportions of the nasals and the slope of the sutures between premaxillæ and maxillæ, mentioned by him, are most variable in modern marsupials of the same genus, and are of no real diagnostic value.

Among the many distinctions between *Wynyardia* and *Cænolestes* which can be noted by comparing the two forms, I have drawn up the following, which seem to be significant :—

The squamosal is extremely large (" a very remarkable feature"—Spencer) in the Tasmanian fossil, and excludes the alisphenoid from union with the parietal, whilst in *Cænolestes* the alisphenoid has a wide union with the upper element.

The zygomata are massive in *Wynyardia* and set relatively high ; in *Cænolestes* they are slender and are set low.

The lachrymal in *Wynyardia* is so well developed that it actually prevents contact between the maxillary and nasal bones, being in striking contrast to the American form.

The occipital regions in the two fossils are quite unlike.

So far as can be judged from the mandibular fragment of *Wynyardia*, it is utterly dissimilar from the lower jaw of *Cænolestes*.

The tibia of *Wynyardia* is of a very different type, and the fibula "is a complete separate bone."

It should be stated that Osgood recognised that his comparison between the two forms was "rather unsatisfactory as a basis for positive conclusions."

Osgood also compares *Wynyardia* with extinct American forms, *Palæothentes* and *Abderites*, allied to *Cænolestes*. One of the most remarkable features of the Tasmanian fossil is the presence in the incomplete ramus of the lower jaw of "a deep depression across the upper surface, which must apparently have been situated in the area occupied by the molar series. It extends in a slanting direction from side to side across the jaw, and its smooth, rounded floor-surface and margins show clearly that it is not a mere break in the jaw. With this is associated a swelling on the internal face. . . ." (Spencer, p. 784). The describer suggests that it may have been associated with the presence of a large sectorial tooth in the molar or premolar series such as is developed in *Abderites*. Gregory (1910, p. 215) instances an alveolar groove in Ameghino's *Garzonia minima*, and Osgood, in 1921, writes that the structure of the lower sectorial tooth in *Abderites* "seems closely comparable to the condition in *Wynyardia*." When Ameghino's figures of *Abderites meridionalis* and of *Garzonia minima* are consulted, it seems to the writer that there is no evidence whatever of relationship. In these American fossils we see no sign of the remarkable contours figured for *Wynyardia*. Assuming that the depression represents diastemata between molar series and incisors, then there is no similarity between the two groups of fossils. Should this smooth transverse furrow be interpreted as representing the site of a large sectorial tooth that had been accidentally lost long before the death of the animal, then comparisons for this special feature might quite as well be instituted between *Hypsiprymnodon* or even *Phalanger*, present Australian forms with prominent oblique premolars. To suggest a theory of relationship on the possible shape of a tooth that is not even represented by an alveolus is, however, far beyond the scope of this paper.

In the light of our present knowledge, there appears to be no valid reason for suggesting that *Wynyardia bassiana* is related to the cænolestids of South America.

Two fossils from eastern Australia are significant because they demonstrate combinations of characters. *Burramys parvus* from Taralga, N.S.W., described by R. Broom in 1895, has a large grooved premolar, and is probably an annectant form between the Macropodidæ and Phalangeridæ. *Triclis oscillans*, from King's Creek, Darling Downs, Queensland, has somewhat similar characters, and was compared by De Vis (1888) to the existing *Hypsiprymnodon*.

In 1916 W. D. Matthew described, under the name of *Eodelphis browni*, a primitive opossum from the upper Cretaceous of Alberta. Referring to this form, Gregory (1920, p. 156), in reviewing the early polyprotodont marsupials, says: "The more primitive members (*Eodelphis*) seem to be directly ancestral to the modern Didelphiidæ of North and South America, and were also probably related to the Upper Cretaceous European and Asiatic polyprotodonts that were ancestral to the later Australian members of this group."

BRIEF NOTES ON THE NON-MARSUPIAL FAUNA.

Monotremes.—The absence of monotremes from South America and their special development in Australia is evidence of their northern origin, probably in pre-Tertiary times. The development of *Zaglossus* and *Prozaglossus* (Kerbert, 1913) in Papua is significant. Pliocene monotremes have been recorded by W. S. Dun (1895) from New South Wales. Species of *Zaglossus* have also been recorded by L. Glauert from West Australian deposits, and by Scott and Lord from Tasmania. Two genera are represented in Darling Downs deposits.

Rodentia.—The evidence of other mammals is distinctly favourable to the hypothesis of lengthy and extensive northern land connections. In 1916 the writer remarked on the significance of about fifty autochthonous species of rodents in Australia and Tasmania. Since then the list has considerably increased. So far as I am aware, no alternative to a northern origin of the ancestors of these rodents has ever been suggested.

Reptilia.—With regard to the reptilian fauna, Thomas Barbour, in his valuable study of the Zoogeography of the East Indian Islands (1912) states: "The remarkable development of Ophidia proteroglypha in Australia can hardly be explained by assuming that they came from South America." He holds, on the contrary, that they originated in Asia and spread through Australia to South America (p. 155). He refers elsewhere to the strong Australian and perhaps a Papuasian tinge in the fauna of Timor, instancing *Chelodina* and *Liasis*.

If we eliminate such genera as *Typhlops* and *Natrix*, which are cosmopolitan and presumably palæogenic forms, we find that the affinities of our ophidian fauna are certainly not with America. There are no true pythons in America, and our genera of constricting snakes are evidently northern in origin. Of the Acrochordinæ, *Acrochordus* and *Chersydrus* are northern, and this also applies to the genera of Homalopsinæ and to *Dendrophis*. Compared with the rich development of Elapine snakes in Asia, Africa, and Australia, this group is sparsely represented in America. The Hydrophiinæ have special means of distribution, but if they are entitled to consideration they tell the same story. The paramount affinities of the Australian snakes as a whole are undeniably northern.

Many species of Ophidia, Lacertilia, and Chelonia are common to North Queensland and Papua.

Of the Lacertilia, the Geckonidæ and Scincidæ are so cosmopolitan that no special significance can be attached to their distribution, although Australia has such distinctive genera as *Nephrurus* and *Trachysaurus*, to mention but two. The Pygopodidæ are confined to Australia and Papua. The Agamidæ and

Varanidæ are African, Asiatic, and Australian in range. There are no Iguanidæ in our region. The lacertilian fauna affords no evidence whatever for an American invasion, and its affinities are decidedly northern.

Amphibia.—Much has been made of the presence of Cystignathidæ in America and in Australia, but it seems exceedingly doubtful whether the many genera of frogs placed in this family in these regions constitute a natural assemblage. Gadow writes: "The numerous genera not only run into each other, but also get entangled with those of other families. In fact the whole family is ill defined." (1909, p. 209). Amongst the amphibians the phenomena of convergence are very well known.

Van Kampen has pointed out that many Indian forms of Amphibia must have reached Papua by ancient land connections (1909).

Fishes.—The evidence of certain fresh-water fishes (Galaxiidæ and Aplochitonidæ) found in Australia, New Zealand, and South America has been repeatedly stressed by the exponents of the Antarctic connection. Tate Regan, however, insists that these are of marine origin (1914) and A. R. McCulloch 1915) actually discovered young specimens of *Galaxias attenuatus* making their way from the coast into fresh water. Regan (*loc. cit.*) points out that the only true fresh-water fishes common to these regions are the Osteoglossidæ, and that our well-known representative of this ancient group (the Barramundi, *Scleropages leichhardti*) has greater affinities with Asiatic forms. He concludes that "neither marine nor fresh-water fishes support the theory that the Antarctic continent connected America with Australia during the Tertiary Period." (p. 41).

Max Weber and de Beaufort have found an Australian element in the fresh-water fishes of the Aru Islands and Waigen, and an interesting summary of their views appears in "The Zoology of the Indo-Australian Archipelago" (1923.)

Flora. The present endemic nature of the great bulk of the Australian fauna is borne out by the testimony of the flora. The "original Australian flora" (to use Maiden's term) is the dominant group on the western side, where it apparently developed. On the east, however, the Austro-Malayan element is the more prominent, and one may reasonably suggest that only an unfavourable environment prevented its extension into temperate regions towards the south and eremian regions to the west. There appears to be no absolute need to postulate a land bridge, suitable for emigrating mammals, with South America to account for the third, or so-called Antarctic element.

The writer is in no way competent to comment on the geological evidence, but, judging from R. N. R. Brown's review of the problems of Antarctica (1923), further exploration is needed before the relationships of the eastern and western portions can be made clear. W. N. Benson, in his able study of Palæozoic and Mesozoic seas in Australasia, gives strong evidence of the land connection of Australasia with Antarctica and South America at the close of Mesozoic times, but it must be noted that, at the same time, there were land connections to the north and north-east linking Australia with the remains of the ancient continent called Æquinoctia, by E. C. Abendanon (1919, p. 577). Similar northern extensions are a salient feature of Hedley's map, published in 1909 (p. 333). The probable extent of this northern continental mass, as it may have existed in early Mesozoic times, is shown by A. B. Walkom (1918, text-figure 2, p. 105). The shallow submarine plateau connecting Australia with Papua, the Aru, and some other islands is called "the Sahul flat" by Molengraaf.

There is some diversity of opinion as to the age of the connections denoted by the great shelves in what Molengraaf calls "the Australasian Mediterranean" (1921), and it is not improbable on zoological evidence that the first connections may have been long anterior to the relatively recent variations, which may have been indirectly effected by glacial and interglacial periods.

Valuable references to the views of authorities on the relationships of the Asiatic and Australian faunas are given in "The Zoology of the Indo-Australian Archipelago" (1923); whilst Chilton (1909) gives an interesting summary of the relationships of circum-austral forms from the New Zealand standpoint.

The assumption of a continent in the Antarctic in early Tertiary times, in order to account for related elements in the faunas and floras of South America, Australia, New Zealand, various Pacific Islands, Madagascar, and South Africa, has proved a veritable Pandora's box to biologists. In order to explain many of the difficulties raised, it is suggested that this circumpolar area had radiating land bridges, inconstant in direction and dimension, apparently reaching out on the one hand to deposit certain types in Pacific archipelagoes; elsewhere stretching to Madagascar to transfer iguanas; extending to New Zealand to allow other forms to gain new land; and independently reaching Tasmania to enable the ancestors of our marsupials to complete a trans-polar journey and find a congenial refuge.

The presence of more extensive land areas in the Antarctic in Mesozoic times is apparently demonstrated, but it seems inprobable that these areas were faunal land bridges for vertebrates. On the other hand, the presence of "ancient continental" islands to the north-west, as shown by Russel Wallace in "Island Life" and the "Geographical Distribution of Animals," is undoubted. That the evidence of these "ancient continental" islands is incomplete is doubtless due to partial or entire submergence. In this connection it is interesting to note that Weber and Beaufort (1912) in their analysis of the fresh-water fishes of Timor found that this fish fauna was "almost totally composed of immigrants from the sea," the inference being that the island had been largely submerged in Tertiary times.

Possibly fossils from the Austro-Malayan-Asiatic regions will one day be forthcoming to strengthen the view that our marsupials had a northern origin probably before "Wallace's Line" had significance as a partial barrier. But even on existing evidence, it seems to the writer that the alternative route of Antarctic land bridges involves us in far greater difficulties and anomalies.

CONCLUSIONS.

A fundamental consideration regarding the origin of Australian marsupials is the undoubted fact that the group was once widely distributed in Holarctic or northern regions.

A second consideration is the present-day knowledge that North Australia and Papua maintain a wealth of diverse marsupial genera, the significance of which could not be realised in earlier discussions.

A third consideration is the demonstration that our extinct marsupial fauna was even more distinctly Australian than that of to-day; the evolution of the group has largely taken place here.

A fourth consideration is that the differences between *Wynyardia bassiana,* our oldest marsupial fossil, and the South American Cænolestids far outweigh the resemblances.

A fifth consideration is that the most characteristic group of Australian marsupials, the Diprotodontia, has little or nothing in common with South American forms; the slight resemblance between *Cænolestes* and our diprotodonts is probably due to convergence.

A sixth consideration is the demonstration by Osgood that "didelphids and cænolestids were already well distinguished in the Patagonian Miocene," and that "the view that all the living families of marsupials were well differentiated early in the Tertiary seems to be well founded" (p. 131).

A seventh consideration is the rich development of the primitive family Peramelidæ in the Austro-Malayan region.

An eighth consideration is that distinctive syndactylism is a special Australian feature; Wood Jones has analysed the alternative values of dental and pedal characters, demonstrating that syndactylism is the more primitive feature.

These and other considerations are supported by evidence, briefly outlined in this paper, dealing with the probable relationships of several non-marsupial groups (monotremes, rodents, etc.) of the Australian fauna, and the work o zoogeographers on the Indo-Australian Archipelago is considered of specia importance.

LITERATURE CITED.

Abendanon, E. C. .. .. 1919, Journ. Geol., 27, p. 577.

Alexander, W. B. .. .. 1918, Journ. Roy. Soc. West. Aust., IV., pp. 31-36.

Allen and Barbour .. .. 1909, Proc. New Eng. Zool. Club, 4 (*Suillomeles*).

Ameghino, F. .. .. 1903, Los Diprotodontes, An. Mus. Nat., Buenos Aires, ser. III, tom. II, pp. 81-192.

Bangs, O. .. .. 1898, Proc. Biol. Soc. Wash., XII., pp. 161-165.

Barbour, T. .. .. 1912, Mem. Mus. Comp. Zool. Harv., XLIV., No. 1.

Bensley, B. A. .. ... 1903, Trans. Linn. Soc. Lond (2), IX., pp. 83-217.

Benson, W. N. .. .. 1923, Trans. N. Zeal. Inst., vol. 54, pp. 1-62.

Broom, R. .. .. 1895, Proc. Linn. Soc. N.S.W. (2), X., pp. 563-567 (*Burramys*)

Ibid. .. .. 1911, Proc. Linn. Soc. N.S.W., XXXVI., pp. 315-320.

Brown, R. N. B. .. .. 1923, Scottish Geographical Mag., XXXIX., pp. 172-181.

Chilton, C. .. .. .. 1909, Subantarctic Islands of New Zealand, II., Article XXXV.

De Vis, C. W. .. .. 1888, Proc. Linn. Soc., N.S.W. (2), III., pp. 5-8 (*Triclis*).

Dun, W. S. .. .. 1895, Rec. Geol. Surv., N.S.W., IV.

Flynn, T. Thomson .. .. 1923, Q.J.M.S., vol. 67, pt. 1, April.

Forbes, H. O. .. .. 1893, Natural Science, III., pp. 54-57.

Gadow, H. .. .. 1909, Amphibia and Reptiles, Camb. Nat. Hist.

Gidley, J. W. .. .. 1915, Proc. U.S. Nat. Mus., vol. 48, pp. 395-402.

Glauert, L. .. .. 1910-1914, Records West Aust. Mus., I., pts. 1, 2, and 3.

Ibid. .. .. 1920, Jr. & Proc. Roy. Soc., West. Aust., VII.

Gregory, W. K. .. .. 1910, The Orders of Mammals, Bull. Amer. Mus. Nat. Hist., XXVII.

Ibid. .. .. 1920, The Origin and Evolution of the Human Dentition, Journ. Dental Research, vol. II.

Guppy, H. B. .. .. .. 1887, The Solomon Islands, p. 160.

Haswell, W. A. .. ... 1914, Fed. Hdbk. Brit. Assn. Mtg., Aus.

Hedley, C. .. .. .. 1893, Natural Science, III., pp. 187-191.

Ibid. .. .. 1893, Austr. Assn. Adv. Science, V., pp. 444-446.

Ibid. .. .. 1895, Jr. & Pr. Roy. Soc., N.S.W., XXIX., pp. 278-286.

Ibid. .. .. 1899, Proc. Linn. Soc., N.S.W., XXIV., pp. 391-417.

Ibid. .. .. 1909, Austr. Assn. Adv. Sci., XII., p. 333.

Ibid. .. .. 1912, Proc. Linn. Soc. Lond., 124th Session, pp. 80-90.

Jensen, H. I. .. .. .. 1912, Proc. Roy. Soc., Qld., XXIII., pp. 149-198.

Jentink .. .. .. 1911, Notes Mus. Jentink, 33, pp. 233-238.

Kampen, P. N., van .. .. 1909, Bijblad Nat. Tijdschr., Ned. Indie.

Kerbert, C. .. .. .. 1913, Zool Anz., pp. 162-167.

Longman, H. A. .. .. 1916, Mem. Qld. Mus., Vol. V. (*Muridæ*).

Ibid. .. .. 1917, Proc. Roy. Soc. Qld., vol. XXIX., p. xii. (*Phascolomys*).

Ibid. .. .. 1921, Proc. Roy. Soc. Qld., XXXIII., p. xiv. (*Sarcophilus*).

Ibid. .. .. 1921, Mem. Qld. Mus. VII., pt. 2 (*Euryzygoma*).

Lord, C. E. .. .. .. 1918, Papers Royal Society, Tasmania, pp. 16-52.

Lydekker, R. .. .. 1907, "Nature," vol. 75, p. 499.

Maiden, J. H. .. .. 1914, Fed. Hdbk., Brit. Assn. Mtg., Aus.

McCulloch, A. R. .. .. 1915, Austr. Zool. I., pp. 47-49.

Mjoberg, E. .. .. .. 1915, Vet. Ak. Hd., Bd. 52, pp. 13-20.

Molengraaf, G. A. F. .. 1921, The Geographical Journal, LVII., February.

Osgood, W. H. .. .. 1921, Monograph of Cænolestes, Field Mus. Nat. Hist., Zool. Ser. XIV., No. 1.

Regan, C. Tate .. .. 1914, Brit. Antarct. "Terra Nova" Exped., Zool. I., pp. 1-54.

Scott, H. H. .. .. 1915, Geol. Sur. Rec. Tas., No. 4 (*Nototherium*).

Ibid. .. .. 1917, Mus. Brochure, No. 6, Launceston.

Scott & Lord .. .. 1920, 1921, 1922, Papers Royal Society, Tasmania.

Sinclair, W. J. .. .. 1906, Repts. Princeton Univ. Exped. Patagonia, IV., Pal.

Spencer, Baldwin .. .. 1892, Austr. Assn. Ad. Sci. IV., pp. 82-124.

Ibid. .. .. 1896, Horn Exped. Rep., pt. 1, pp. 171-199.

Ibid. .. .. 1900, *Wynyardia*, Proc., Zool. Soc., pp. 776-794, plates XLIX. & L.

Thomas, Oldfield .. .. 1888, Brit. Mus. Catal. Marsupialia.

Ibid. .. .. 1895, On *Cænolestes*, P.Z.S., pp. 870-878.

(Genera and species of recent marsupials described by Oldfield Thomas are mentioned in the text with dates ; these have mostly appeared in the Annals and Magazine of Natural History.)

Walkom, A. B. .. .. 1918, Proc. Linn. Soc. N.S.W., vol. 43, pp. 37-115.

Wood Jones, F. .. .. 1923, The Mammals of South Australia, pt. 1.

Weber & Beaufort .. .. 1912, Kon. Akad. van. Wetenschappen, Amsterdam.

1923, The Zoology of the Indo-Australian Archipelago (Published by the Section [illegible] Zoology of the I.C.O. Committee, Kon. Akad. van Wetenschappen, Amsterdam.)

SOME QUEENSLAND FOSSIL VERTEBRATES.

BY HEBER A. LONGMAN, F.L.S., DIRECTOR, QUEENSLAND MUSEUM.

(Plates I.-IV.)

Introduction.—This paper contains descriptions of a new genus of Cretaceous marine reptiles from Hughenden, and a new species of crocodile from alluvial deposits at Tara Creek. A new generic name is proposed for *Triclis* De Vis (preoccupied). The status of several species of Queensland fossil vertebrates is discussed in the light of new or revised material, and a record is made of a series of remains from the Marmor Quarry.

DIPROTODON AUSTRALIS Owen.

Four specific names have been given to remains of *Diprotodon* from Australia. Owen's *D. australis* was first described in 1838[1] *Diprotodon minor* was differentiated by Huxley in 1862[2], and in 1888 De Vis[3] further particularised this species. *Diprotodon longiceps* was described by McCoy in 1876, from the "Pliocene Clays of Colac," his cranial material showing when compared with *D. australis*, a more slender or comparatively elongate head, and with longer and straighter lower incisors.[4] In 1877 Owen gave the name "*Diprotodon bennettii*" to an incomplete right mandibular ramus from Mandoona, N.S. Wales, as "an established variety or species of *Diprotodon*" (p. 510) which was also of a more slender type than *D australis*.[5] This specimen, *No. 46056*, was subsequently included by Lydekker in *D. australis* [6] Stirling and Zietz,[7] in their review of the Callabonna material, point out that there are numerous remains that give evidence of "a relatively small-sized Diprotodon," the differences between it and the larger forms being "mainly one of size." Although these authors consider the difference of bulk to be too great to be probably due to sexual characters, they do not altogether dismiss this possibility.

The largest cranium of *D. australis* in the Queensland Museum is 3 ft. 1½ in. in maximum length, but judging from the proportions of certain fragments in our collections it seems probable that some specimens of *Diprotodon* had skulls at least 3 ft. 6 in. long. The breadth of an anterior upper incisor may be as great as 60 mm. The lower incisors may exceed a foot in length;

[1] Owen, R., in Mitchell's "Three Expeditions into Eastern Australia, 1838, Vol. II., p. 362.

[2] Huxley, T. H., Quart. Journ. Geol. Soc., XVIII., 1862, pp. 422-427.

[3] De Vis, C. W., Proc. Roy. Soc. Qld., V., 1888, pp. 38-44.

[4] McCoy, F., Prod. Pal. Victoria, Dec. IV., 1876.

[5] Owen, R., Extinct Mammals Austr., 1877, p. 510.

[6] Lydekker, R., Catal. Foss. Mamm. Brit. Mus., V., 1877, p. 176.

[7] Stirling & Zietz, Mem. Roy. Soc. South Aus., I., 1899.

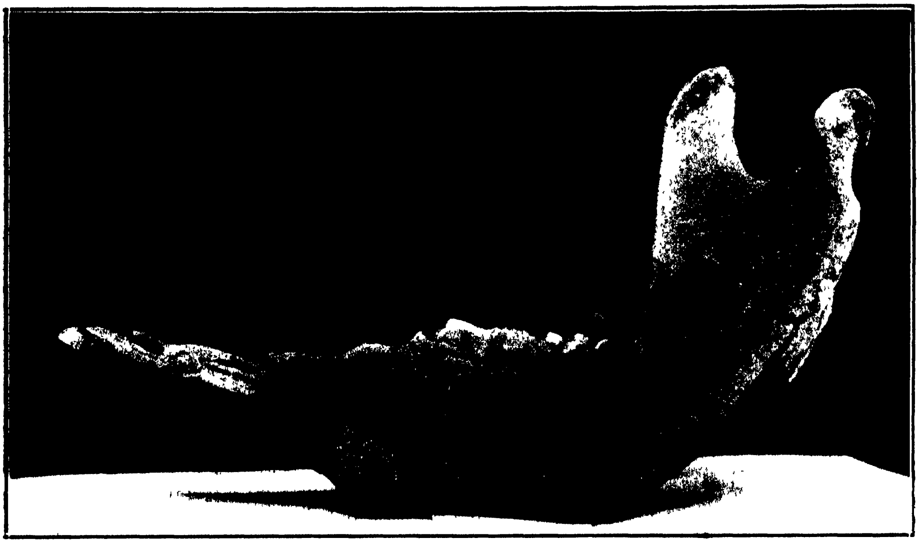


Fig. 1.—Mandible of *Diprotodon australis* Owen, with broken incisor. Maximum length 702 mm.

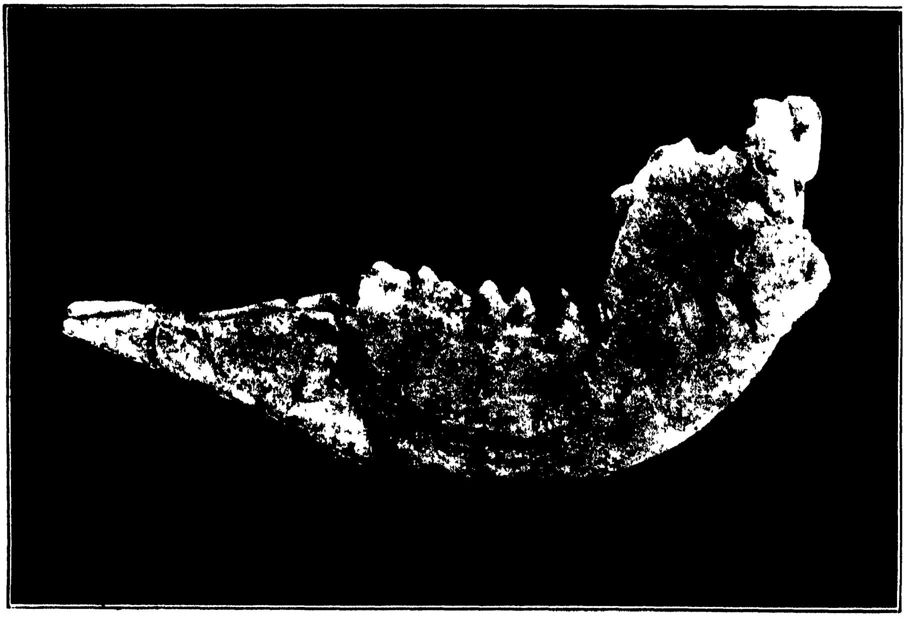


Fig. 2.—Mandible of *Diprotodon minor* Huxley. Maximum length 535 mm.

Photos., W. J. Sanderson.

McCoy mentioned 13½ in. for his *D. longiceps*. These incisors, however, are most variable. In a juvenile specimen the length of the protruding part may be about equal to the antero-posterior diameter of a single molar, but in aged specimens it may more than exceed that of three molars. Probably the variation in mature specimens is partly attributable to sex characteristics, but it seems almost certain that there were two distinct species.

In October, 1922, Mr. Thomas Jack, of Dalby, forwarded to the Queensland Museum a number of remains, including fairly complete associated specimens of a right tibia, fibula, astragalus, calcaneum, and other pedal bones, together with the distal end of a femur of *Diprotodon australis*, which had been found in Jimbour Creek, Darling Downs. These fossils are remarkable for their unusual size. The maximum width, taken between vertical parallels, of the condyles of the femur is no less than 236 mm. The width of a complete femur on exhibition is 196 mm. in this region, and this bone is 745 mm. in maximum length. Although the proportions of the massive structure of the articular region are not likely to be fully represented in total length ratios, it is obvious that Mr. Jack's specimens demonstrate a very large Diprotodon.

A fairly complete mandible of *Diprotodon australis*, sent in by the late Mr. N. Pearson, from Nobby, Darling Downs, in April, 1913, is of interest because one of its incisors bears undoubted evidence of a complete fracture during life which doomed the animal to complete the remainder of its existence with a shortened tusk As may be seen from Plate I., fig 1, about one-third of the left incisor is missing. That this incident took place some time before death is obvious, for the fractured part has become relatively smooth on its exposed surfaces, though signs of the trouble are still noticeable in its irregular outlines. A splinter is also missing from the lateral surface near to the apex of the right incisor, and this area has been smoothed over. Whether the individual was a bellicose male who suffered as the result of conflict with his fellows, or perchance even because of domestic troubles, it is difficult to surmise, and the accident may have been the result of a clumsy fall. In view of the evidence recorded by Sterling and Zietz that Diprotodons fed on low shrubs (Salsolaceæ, Amarantaceæ, etc.), as deduced by palæobotanists from associated remains, it seems unlikely that the giant marsupial sustained an accident when attempting to reach arboreal food, and its pedal structure almost precludes this possibility. But whatever the cause, this fractured tusk demonstrates that peace was not the invariable portion of these huge herbivores in bygone days.

DIPROTODON MINOR Huxley.

Among the numerous fragments attributed to *Diprotodon* in the Queensland Museum there are several specimens tentatively classed as *D. minor*. The most interesting of these is a fairly complete though much-crushed cranium, with mandible and a number of associated bones, received from the Darling Downs in 1909, the donor being Mr. Charles Campbell, Surveyor. The cranium has been obliquely compressed, yet the process must have taken place very gradually, for even the slender zygomata are not badly fractured. The molar series with the premolar is complete on each side. Although the wear manifested by the molars does not suggest the maximum of growth, the maturity of the individual is demonstrated by the fact that the hind lobes of both fourth molars have complete loops of dentine exposed, these being 5·5 mm. in antero-posterior diameter.

As it seems desirable to put on record data bearing on the question of a second species, the following dimensions are given :—

Maximum length of cranium from condyles to anterior edge of incisors	670
Diastema	119
Width of anterior incisor at emergence from alveolus	42
Antero-posterior diameter of molar series with p.m.^{4} right	207
Antero-posterior diameter of molar series with p.m.^{4} left	202
Width of m^1, anterior lobe	32
Width of m^2, anterior lobe	41
Width of m^3, anterior lobe	48
Width of m^4, anterior lobe	48
Width of m^4, posterior lobe	38·5

Owing to inequalities of wear in the premolars, satisfactory comparisons cannot be made between the features of these teeth in *D. australis* and *minor* as set out by Huxley and supplemented by De Vis. The measurements of the true molars are, on the whole, larger than those given for *D. minor* by Huxley. The lower jaw has a maximum length between verticals of 535 mm. The incisors are relatively small and do not protrude from their alveoli more than 90 mm. on the superior surface. No premolars are present.

In this specimen the distinctive features of *D. minor* as mentioned by De Vis (1888, p. 42) are present in the region of the mandibular symphysis. It must be added, however, that in some of our fragments the dimensions of the molar teeth in small mandibles are equal to those in very bulky jaws. Elongate and presumably male incisors are occasionally to be found in slender jaws of the *minor* type.

Although the evidence is not quite conclusive, a distinction between the two forms may be conveniently set out as follows :—

Mandibular symphysis broad at base of incisive sockets ; antero-inferior border terminating in an abrupt upward curve	***Diprotodon australis.***
Mandibular symphysis relatively narrow at base of incisive sockets ; antero-inferior border sloping gradually to the plane of the incisors	***Diprotodon minor.***

Four specimens illustrating these differences are shown on Plates I. and II.

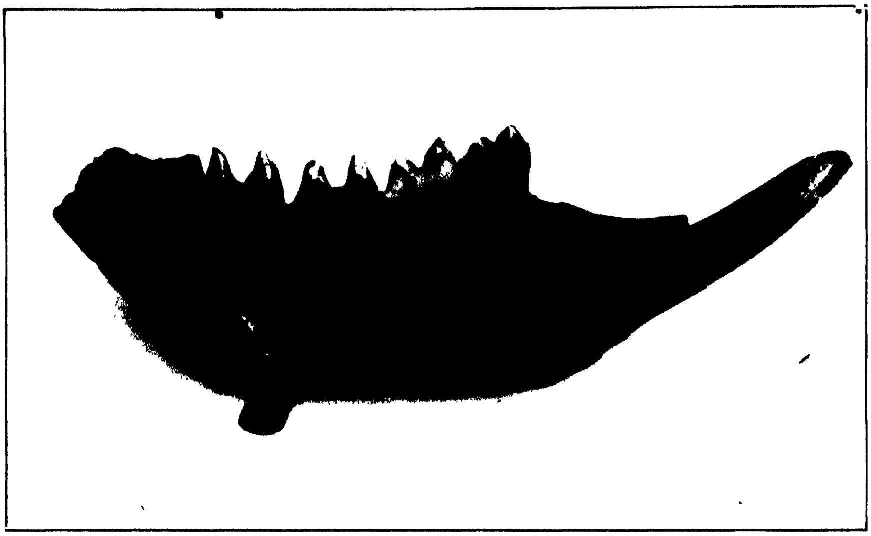


Fig. 1.—Incomplete mandible of *Diprotodon minor* Huxley. Maximum length 384 mm.

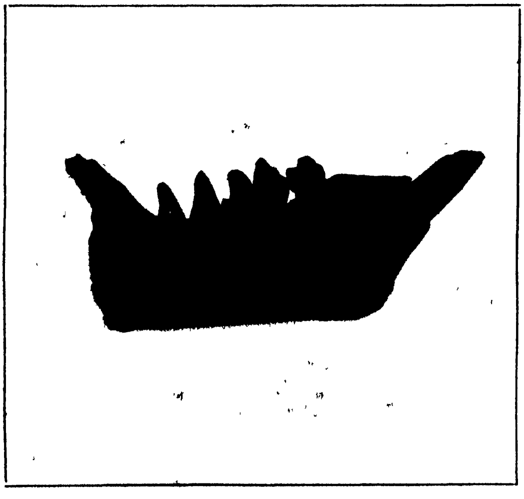
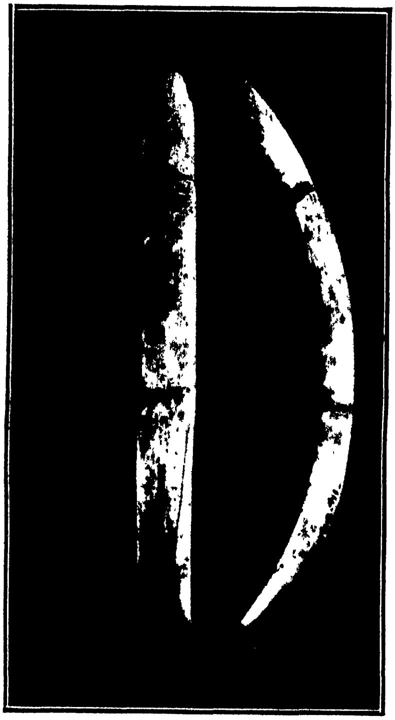


Fig. 2.—Incomplete mandible of juvenile *Diprotodon australis* Owen. Maximum length 212 mm.



Figs. 3 and 4.—Incisor of *Phascolomys magnus*.

In passing, it may be noted that a present-day parallel for the existence of two associated species, mainly differing in size, is afforded by *Macropus giganteus* and *M. melanops*, the specific distinction of the latter having been recently affirmed by A. S. Le Souef.[8]

EURYZYGOMA DUNENSE (De Vis).[9]

In October last Mr. Thomas Jack donated an exceptionally well-preserved fragment of the above species, which had been secured in a well at Ehlma Siding, near Brigalow, at a depth of sixty-five feet. The specimen consists of a portion of the right maxilla with the first three true molars. Part of the zygomatic process is present, and the peculiar structure of this region (associated with the enormous development of the infero-lateral processes as described by the writer in 1921)[10] at once shows the relationship of the fossil with this very distinct form.

PHASCOLONUS GIGAS Owen.

In 1913 the late Sir Edward Sterling was able to demonstrate beyond doubt the association of the remarkable curved scalpriform teeth, previously known as *Sceparnodon ramsayi* Owen, with the molars of *Phascolonus*, and the distinction of this genus from the ordinary wombats.[11] This was made possible by the fine associated material found at Lake Callabonna and Normanville. As some controversy had arisen over the status of the incisor teeth, previously in doubt, and as De Vis had advanced other views and figured three kinds of teeth, it is advisable to review the specimens in the light of our fuller knowledge.

In passing, it may be said that the astonishing variety manifested in the dentition of our fossil marsupials is sufficient explanation, if such be needed, for the views advanced by De Vis when dealing with isolated teeth or very inadequate material. In the opinion of the writer the tooth figured by De Vis (1891, Plate XXII.) as a right lower incisor is a left upper incisor[12] This is evidently a tooth from an immature individual, and it may be compared with that figured by Sterling (1913) in Plate XLV., fig 6. The minimum width of this tooth is 16 mm. and the maximum at the incomplete radical end is 21. Apparently the young teeth are tapering, but the adult incisors may be parallel-sided and as much as 40 mm. in width. W. S. Dun's study of these teeth in 1894 affords other instances of variation.[13]

In 1893 De Vis published[14] a description of a maxillary fragment and also figured (Plate I.) a large incisor purported to be a right upper incisor of

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[8] Le Souef, A. S., Austr. Zool., III., 1923, pp. 145-147.

[9] De Vis., C. W., Proc. Linn. Soc. N S.W., II. (2), 1887, pp. 1065-1070.

[10] Longman, H. A., Mem. Qld. Mus., VII., pt. 2, 1921, pp. 65-80.

[11] Sterling, E. C., Mem. Roy. Soc. S. Aus., I., 1913, pp. 111-178.

[12] De Vis, C. W., Proc. Linn. Soc. N.S.W., (2) VI., 1891, pp. 258-262.

[13] Dun, W. S., Rec. Geol. Surv. N.S.W., III., 1892, pp. 25 28.

[14] De Vis, C. W., Proc. Linn. Soc. N.S.W., VIII. (2), 1893, pp. 11 12.

Phascolonus gigas. It is somewhat surprising to find that this isolated tooth agrees in detail with left lower incisors of *Euryzygoma* (*Nototherium*) *dunense*, of which there are now mature examples *in situ* in mandibles probably not available to De Vis in 1893. In sculpturing and dimensions these incisors agree admirably.

PHASCOLOMYS MAGNUS Owen.

(Plate II., figs. 3 and 4.)

A left upper sub-circular incisor of the *Phascolomys curvirostris* type from Gowrie Creek, Darling Downs, has been identified with *Phascolomys magnus*, with some little hesitation, as no anterior teeth have been previously associated with this species. Its dimensions are larger than those of a cast of the type of *P. curvirostris*, and the curve is greater. Following the upper surface of the arc, this tooth, which is almost perfect, is 176 mm. in length. The maximum breadth is 17 mm.; the antero-posterior diameter is 12·5 and the working surface is 26 mm. in extent. The dimensions are fairly regular throughout, and the tooth is but slightly smaller towards the apex. The inner side of this incisor is not flattened, but uniformly convex. The superior and lateral surfaces are clothed with slightly rugose enamel, and throughout the entire length there are fine but distinct parallel flutings. On the outer part of the ventral surface there is a shallow channel, but, with this exception, a section of the tooth shows even curves. A prominent pulp cavity is seen at the radical end, although this is infilled with fine debris.

In response to my inquiry, Dr. C. Anderson, Director of the Australian Museum, informs me that the type specimen of *Phascolomys curvirostris* is not in their collection, notwithstanding Lydekker's remarks,[15] so further comparison cannot be instituted. The writer suggests, however, that incisors of the *curvirostris* type will some day be found in association with molars of *Phascolomys medius,* and the anterior and posterior dental elements of these large wombats will then be fully elucidated.

PROPLEOPUS, new generic name.

PROPLEOPUS OSCILLANS (De Vis), 1888.[16]

Owing to the preoccupation of *Triclis* De Vis (1888) by *Triclis* Loew. (1851), the interesting mandible described by the Queensland palæontologist as *T. oscillans* requires a new generic name. De Vis rightly regarded this fragment as having paramount affinities with *Hypsiprymnodon*[17], and it seems appropriate to utilise Owen's name *Pleopus* (given a year later than Ramsay's),[18] with a prefix denoting antiquity, for this fossil. The affinities exhibited by the dental characters are so definite that they may have been associated with similar pedal structures, but this assumption cannot be verified. As De Vis in his original description used the term Pleopodidæ to embrace what he considered to be the more generalised *Triclis* and the specialised *Hypsiprymnodon*, the new name, *Propleopus*, may be deemed applicable on these grounds.

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[15] Lydekker, R. Catal. Foss. Mamm. V., 1887, p. 152.

[16] De Vis, C. W., Proc. Linn. Soc. N.S.W., III. (2), 1888, pp. 5-8.

[17] Ramsay, E. P., Proc. Linn. Soc. N.S.W., I., 1876, p. 4.

[18] Owen, R., Ann. Mag. N.H. XX. (4), 1877, p. 542.

MARMOR QUARRY FOSSILS.

Through the interest and enthusiasm of Mr. Samuel Evans, J.P., of the Limestone Quarry at Marmor, on the North Coast line, 24 miles south of Rockhampton, several consignments of fossil bones have been received during the last few years.

Unfortunately most of the specimens are very fragmentary, so much so that it is deemed inadvisable, on the present material, to give specific names to several. The list is as follows :—

Thylacoleo carnifex Owen.—Incomplete lower carnassial from the right-hand side; the cutting edge is but little worn; also a calcaneum. It is interesting to be able to add another locality for this remarkable marsupial, which was received through Mr. L. C. Ball.

Trichosurus sp.—Incomplete left mandible. With the exception of the third true molar the crowns of the teeth are missing. Closely comparable with large specimens of the existing *T. vulpecula*.

Diprotodon australis Owen.—Incomplete molar tooth and remains of a vertebra.

Phascolomys sp.—Abraded teeth, including one complete molar, evidently representing a large species, closely comparable with *P. mitchelli*.

Macropus sp.—Remains of molar series which are probably identical with *M. ualabatus*.

Macropus anak Owen.—Fragments of molars of this large extinct kangaroo, which is commonly represented in our Darling Downs material.

Megalania prisca Owen[19].—A single vertebra, somewhat abraded, presents evidence of this gigantic lizard. The presence of facets for chevron bones shows that it belonged to the caudal series. The maximum antero-posterior diameter of the specimen is 37·5 mm., and the diameters of the cup are 18 and 11 mm. The small dimensions suggest a unit from the posterior portion of the tail.

Baron G. J. de Fejérváry[20] has emphasised what he considers a special development of the zygantrum and zygosphene in the Megalanian vertebræ as compared with *Varanus* in his interesting review of the group, and he has established the family Megalanidæ. Lydekker[21] compared the vertebræ of *Megalania* with those of *Varanus sivalensis*, stating that they agree in general character. There is considerable variation in size and characteristics associated with the vertebræ of present-day species of *Varanus*, and it seems doubtful whether *Megalania prisca* is entitled to special distinction on these grounds from the Monitors.

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[19] Owen, R., Phil. Trans. Roy. Soc., Vol. 149, 1860, pp. 43-48.

[20] Fejérváry, Baron G. J. de., Ann. Mus. Nat. Hungarici, XVI., 1918, pp. 341-467.

[21] Lydekker, R., Catal. Foss. Rept. Amph. B.M., 1888, Pt. 1, p. 284.

In the opinion of the writer it is quite incorrect to interpret the vertebræ of *Megalania prisca* as possessing "a strongly developed zygosphen and zygantrum." When a comparison is made between the Megalanian vertebræ and those of reptiles in which the complex articulation of a zygosphene and zygantrum is present in addition to the lateral and more normal facets, such as in *Iguana* or in *Python*, it is obvious that Baron Fejérváry is mistaken in his nomenclature. In *Megalania* the central portion of the neural arch carrying the postzygapophyses is not recessed as a zygantrum, and the supposed zygosphene of Baron Fejérváry is not present between the prezygapophyses. The normal concavities on either side of the median line on the posterior aspect of the neural arch should not be interpreted as a zygantrum. The supposed zygosphene of Baron Fejérváry is merely a small and irregular area above the neural canal on the anterior side and which, in some specimens, may have small lateral tubercles, as recorded by Owen (1881, p. 1038)[22], but which is mainly composed of the anterior ridge of the neural spine. This area varies considerably in its development in different vertebræ, but is never very prominent, and in some specimens is entirely lacking. (Parenthetically, it may be noted that the anterior ridge of the neural spine may be strongly developed in vertebræ of Australian species of *Varanus* to-day.) When two Megalanian vertebræ are closely approximated, it will be seen that these small and variable structures could not have functioned as articulating facets. To refer to them as "a strongly developed zygosphen and zygantrum" is contradictory. It is correct to interpret the articular facets of *Megalania* as strongly developed pre- and post- zygapophyses, and in this respect they differ only in size from the vertebræ of present-day Australian species of *Varanus*.

In 1890 De Vis[23] tentatively expressed the opinion that *Megalania prisca* and *Notiosaurus dentatus* were identical, and this was also stated on our labelled specimens. This contention was subsequently confirmed by R. Etheridge[24].

Included among the other specimens forwarded by Mr. Evans were the mandible of a rat, with molars larger than those of *Rattus norvegicus*, and the humerus of a bat which is identical with that of *Megaderma gigas*.

It is almost certain that the specimens forwarded by Mr. Evans represent distinct periods of deposition.

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[22] Owen, R., Phil. Trans. Roy. Soc., Vol. 171, 1881, p. 1038.

[23] De Vis, C. W., Proc. Roy. Soc. Qld., II., 1885, p. 25, and VI., 1890, p. 97.

[24] Etheridge, R., Proc. Roy. Soc. Vict., XXIX, (2), 1917, p. 127.

NOTE BY Mr. L. C. BALL.

Mr. L. C. Ball, Government Geologist, has kindly given me the following notes on the Marmor Limestone Quarry:—" The Mount Morgan Company's quarries have been excavated in a high bluff of Devonian limestone overlooking the township of Marmor, on the North Coast Railway. Some idea of the size of the quarries may be gained from the knowledge that for long periods the shipments amounted to 2,700 tons per week. The rock as a whole is remarkably free from caverns, and it is believed that the bone earth collected by Mr. Evans came from a joint opening and not from a solution cave. I have not yet had an opportunity to investigate the occurrence."

Mr. Ball describes the matrix as an indurated, bone-bearing cave-earth, which is essentially carbonate of lime, with a brownish stain due to the presence of hydroxides of iron.

REPTILIAN REMAINS FROM TARA CREEK.

The Queensland Museum is indebted to Sir Matthew Nathan, Governor of Queensland, for numerous specimens, and in September last the writer received from him a parcel of fossil fragments which had been collected by Mr. J. R. Chisholm from the head of Tara Creek, a tributary of the Clarke River, by Maryvale Creek, North Queensland, over one hundred miles inland from Townsville. The fragments represent *Chelodina insculpta* De Vis (1897), and a new species of crocodile, which has been named *Crocodilus Nathani* in honour of the donor. These specimens are evidently from alluvial deposits, as shown by adhering grit

CROCODILUS NATHANI new species.

(Plate III., figures 1 and 2.)

The specific distinction of the Tara Creek crocodile is mainly demonstrated by the proportions of the mandibular symphysis, which extends barely parallel to the posterior border of the fourth tooth. This characteristic readily distinguishes it from the present-day Australian crocodiles, *C. johnstoni* Krefft and *C. porosus*, and from the fossil *Pallimnarchus pollens* De Vis.

The remains consist of three fragments of dentaries, representing two, or possibly three, individuals, several imperfect teeth, and the greater part of a frontal, with portions of a post-frontal, parietal, and of alisphenoids.

An anterior fragment of a left dentary, with part of the symphysis, contains the alveoli of six teeth, from the third to the eighth, the last being incomplete owing to fracture. The fourth, or enlarged tooth, is nearly twice the diameter of the adjoining cavities. The width of this ramus at the symphysis is 55 mm.; the height to the summit of the fourth alveolus is 57 mm., and the total length of the specimen is 110 mm. Reg. No. *F. 1512.* Plate III., fig. 1.

A second fragment also represents the anterior part of a left dentary, with portion of the symphysis, but this is obviously from a younger specimen, although the general characteristics are the same. It contains the alveoli of six teeth, ranging from the third to the eighth. Reg. No. *F. 1513.* Plate III., fig. 2.

Fortunately the posterior contours of the symphysis are preserved in both these specimens, and the writer is thus able to record a striking distinction between these remains and those of the two present-day Australian species (*Crocodilus porosus* and *C. johnstoni*), as well as the fossil species *Pallimnarchus pollens* De Vis.[25] In these Tara Creek specimens the symphysis is relatively shorter and extends barely to the posterior border of the fourth or enlarged "canine" tooth.

In *C. johnstoni* the symphysis ends parallel with the posterior edge of the sixth tooth, in *C. porosus* it extends to the posterior edge of the fifth tooth, and in the relatively far wider *P. pollens* it also ceases opposite the same tooth. Compared with De Vis' species, *C. Nathani* is much narrower in the symphyseal region; the width of the juvenile mandibular type of *P. pollens* from the symphyseal line to the alveolus of the fourth tooth is almost as great as in the less mature of the two dentaries from Tara Creek, although the teeth of the latter are nearly twice the size and the body of the dentary is far more robust.

A third fragment is from the central portion of a left dentary, and, although the broken contours do not permit actual juxtaposition, it was probably continuous in life with *F. 1512.* It contains the alveoli of seven teeth, two being enlarged and corresponding to the usual giant teeth near the posterior third of the series. Should this have been associated with the large anterior fragment, and it would be a remarkable coincidence if it were not so, it is evident that this inland reptile had six teeth, instead of the usual five, between the enlarged units of the mandibular series.

These three fragments bear a general resemblance to *C. porosus* in the sculpturing of the dentary, the presence of numerous pits and openings connected with the dental canal, and in the position of the tooth series.

Among the several specimens of teeth forwarded, no one is quite complete. The largest tooth has a maximum diameter of 25 mm., whilst the crown is 40 mm. in length. The teeth are slightly compressed laterally, and there are prominent anterior and posterior carinæ. The crowns are marked with numerous fine striations.

The actual extent of the splenial cannot be definitely stated, but, judging from the exposed facets, it terminated anteriorly near to the sixth tooth of the dentary, as in *C. porosus*.

The only cranial element consists of the greater portion of the frontal bone, although the anterior tongue is missing, with portions of the parietal,

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[25] De Vis, Proc. Roy. Soc. Qld., II., 1886, pp. 181-191.

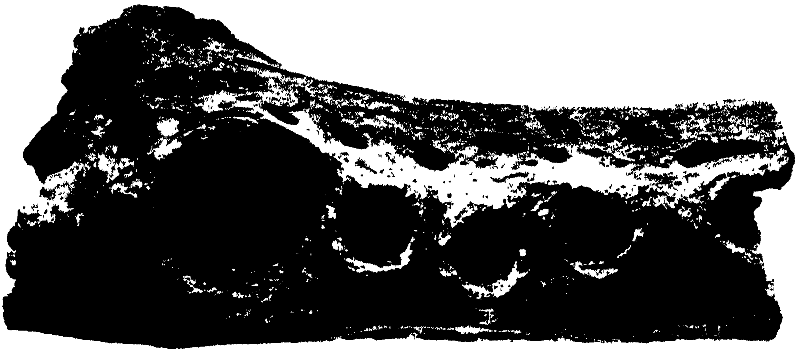

Fig. 1.—*Crocodilus Nathani* Longman. Fragment of anterior portion of left dentary. F. 1512.

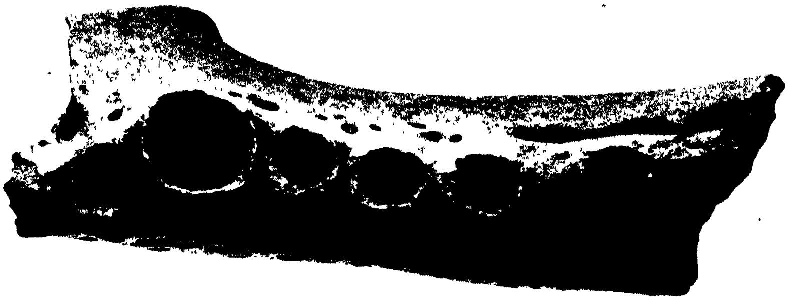

Fig. 2.—*Crocodilus Nathani* Longman. Fragment of anterior portion of left dentary. F. 1513.

the alisphenoids and the left post-frontal. The fronto-parietal suture does not reach the supratemporal fossa, owing to the backward extension of the post-frontal, this characteristic being noted by C. C. Mook as a distinguishing feature of *Crocodilus* in comparison with *Osteoblepharon*.[26] The superior contours of the orbits and of the supra-temporal fossa do not appear to have been very different from those of *C. porosus*, judging from the preserved portions. The external sculpturing and the size of the fossil fragments agree fairly well with the dimensions of corresponding elements on the upper part of a skull of *C. porosus*, which is 610 mm. in length. There are striking differences, however, in the comparative thickness, the frontal being little more than half the depth of the living reptile, although covering the same area superiorly. On the internal surface of the frontal the rhinencephalic groove, or sulcus olfactorius, is not so deep as in the living reptile. The contours of the alisphenoid in its connecting pier with the post-frontal are also very distinct from *C. porosus*. These distinctions are very apparent when direct comparison is made, but are somewhat difficult to put into words. They serve to emphasise the definite difference existing between the mandibles The unusual thickness of the skull bones of *C. porosus* is noted by Mook in his valuable studies of crocodilian osteology. Reg. No. *F. 1514*; probably from the same individual as *F. 1512*.

A fragment of a large dentary from Floraville Crossing, Leichhardt River, previously referred by De Vis to *P. pollens*,[27] evidently belongs to *C. Nathani*. The symphyseal region is too narrow for De Vis' species, and the union terminates parallel with the posterior margin of the fourth tooth.

Affinities—In the absence of comparative material from other parts of the world, it is impossible to deal adequately with the affinities of this inland Queensland species, as it is at present represented. Judging from the symphysis *C. Nathani* has some likeness to *C. palustris* and to *C. sivalensis*, the probable ancestor of the Indian crocodile (Lydekker)[28] There are, however, general resemblances to *C. porosus*, and it seems more probable that this Tara Creek crocodile was a somewhat specialised inland species, derived from the ancestors of *C. porosus*. Such reptiles found a congenial environment in the last geological period, when the inland rainfall was probably far greater. It is evident from palæontological data that species of crocodiles were far more numerous in the past in various parts of the world, and in this connection the ecological studies of these reptiles published by K. P. Schmidt[29] are of interest.

It should be noted that fossil remains of *C porosus* were recorded by Lydekker (*loc. cit.*, p. 59) from the Darling Downs. In the spelling of *Crocodilus* the writer has maintained the common usage in preference to *Crocodylus*.

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[26] Mook, C. C., Bull. Amer. Museum Nat. Hist., XLIV., 1921.

[27] De Vis. Ann. Qld. Mus., No. 7, 1907, p. 6.

[28] Lydekker, R., Catal. Foss. Rept. Amph., Pt. 1, 1888, p. 55.

[29] Schmidt, K. P., Bull. Amer. Mus. Nat. Hist., Vol. XXXIX., 1919.

CHELODINA INSCULPTA De Vis.[30]

This species is at once recognisable by the great thickness of its carapace and plastron (attaining 19 mm. in places) in comparison with present-day species, as well as by the strongly marked though variable sculpturing. The largest fragment consists of the anterior moiety of the plastron, much abraded, with remains of both bridges. Another fragment is part of the right hypoplastral and xiphiplastral bones, the contours of which demonstrate that this species had a pronounced ventral curve on the extreme lateral borders of the posterior part of the plastron.

The carapace is represented by several small fragments, including remains of two posterior neurals with part of the last costal plate, the base of the left ilium being attached. An isolated right ilium, with the iliac section of the acetabulum, is fairly complete and shows that the dimensions of the pelvic elements did not exceed those of large specimens of *Chelodina expansa*, notwithstanding the thickness of the shell. This species has been previously recorded from Eight-mile Plains (near Brisbane), Darling Downs, and the Warburton River.

A NEW GIGANTIC MARINE REPTILE FROM THE QUEENSLAND CRETACEOUS.

KRONOSAURUS QUEENSLANDICUS new genus and species.

(Plate IV.)

A fragment of a very massive sauropterygian mandible, forwarded from Hughenden by Mr. A Crombie, in 1899, demonstrates the existence in Australia in Cretaceous times of a reptile far larger than any yet put on local record. Although tantalisingly incomplete, this fragment presents such definite characters that it is desirable to describe it, so far as the evidence permits, and to give it a distinctive name.

The fossil is a portion of the anterior end of a mandible, and is 200 mm. in maximum length, 120 mm. in height, with a breadth of at least 140 mm., when allowance is made for abrasion.

Teeth.—There are remains of six very large thecodont teeth, three on each side of the symphyseal portion of a massive yet relatively narrow rostrum. Two of these teeth and the alveolus of a third are represented on Plate IV., where the external surface of the mandible is abraded. These teeth have a pronounced slope antero-posteriorly, and it is also evident that the right and left series of alveoli are set obliquely, resulting in a slight divergence of the apices of each tooth from the median line. The preserved portions of the teeth are mainly alveolar and the crowns are missing. From the remains of an unerupted or germ tooth, embedded in the fossil adjoining one of the larger teeth, it appears that the crowns were conical. There is no evidence of either

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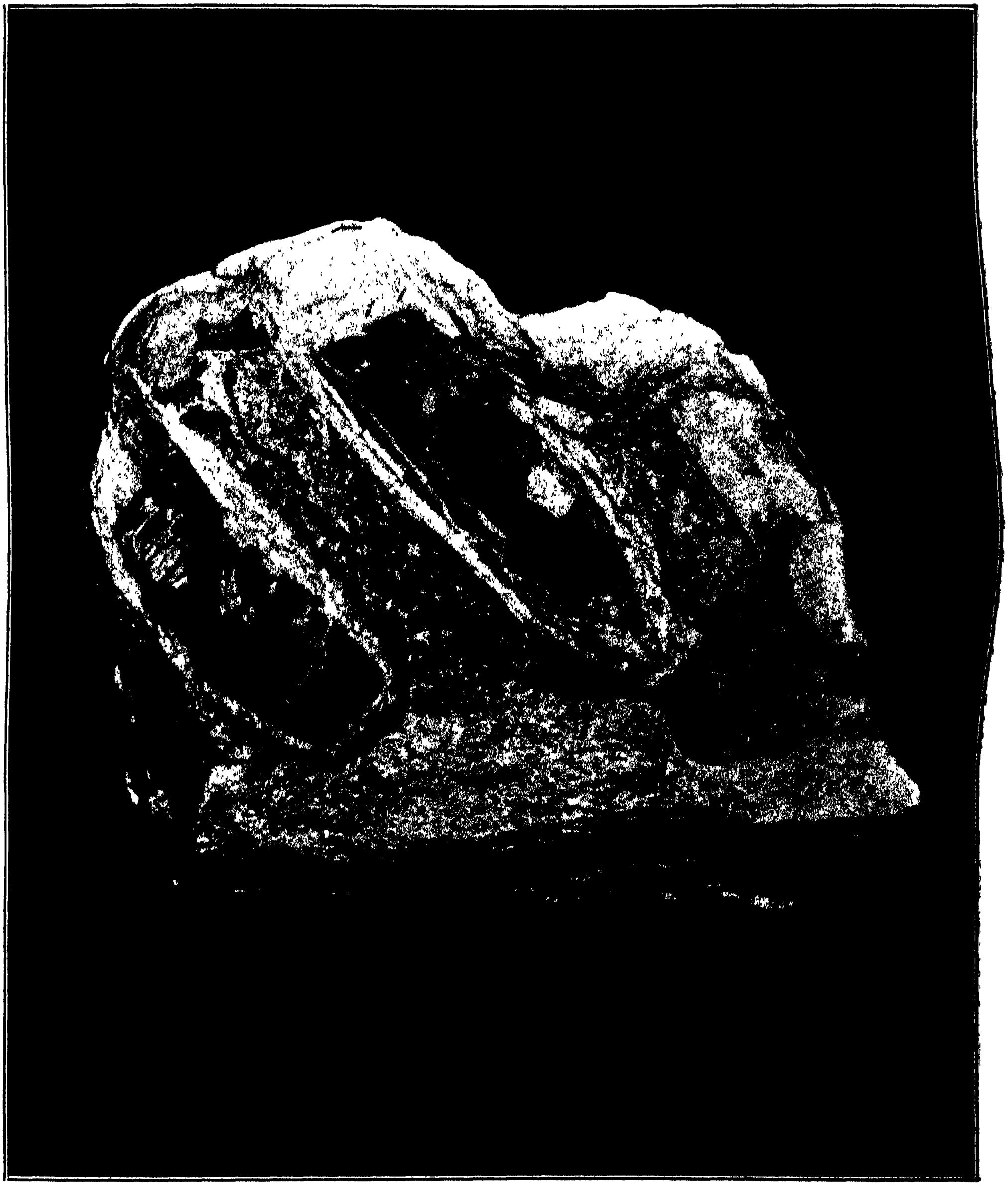
[30] De Vis, C. W., Ann. Qld. Mus. No. 3, 1897, p. 5.



KRONOSAURUS QUEENSLANDICUS Longman.

Fragment of mandibular symphysis, with remains of three teeth and alveoli.
Maximum length 200 mm.

carinæ or flutings in the portions preserved. The immense sockets are distinctly separated, and may reach within 21 mm. of the lower margin of the mandible, but as this has been abraded the bulk of bone here may have been thicker. The teeth have a maximum diameter of 40 mm. in the upper part of the alveolar portion, and this decreases to about 30 mm. at the base. The contours are circular in horizontal sections throughout, and the slight tapering ends abruptly, as in the tooth of *Peloneustes philarchus*[31]. The maximum length of the preserved section of teeth is 140 mm., and this suggests a total length of at least 250 mm., being comparable with that of *Pliosaurus grandis.* The centre line of each tooth is situated about 65 mm. from that of its neighbour. With the exception of a circular sheath, the walls of which are 6 mm. in thickness, the preserved portions of the teeth (dentine and pulp cavity) are entirely changed into a crystalline formation identified as barytes (*see* Note[32]). Between the white enamel-like circular sheath and the walls of the alveolus there is evidence of a thin surrounding film of matrix, which suggests that the teeth were never firmly anchylosed.

Mandible.—The condition of the mandible does not lend itself to detailed description, but it is evident that it represents a type with a pronounced rostrum, and a lengthy symphysis. On the lower surface in the median line a thin vein of matrix marks the juxtaposition of the right and left hand elements. Certain structures, which are more apparent at the anterior end, were at first thought to be splenial elements, but later study makes it more probable that these are remains of a large oval dental canal, on each side, now infilled with fine matrix, connected with the pulp cavities. The mandible in the region preserved is thought to be wholly composed of the two conjoined dentaries. On the superior surface in the median line there was a prominent ridge running above and between the alveolar borders. In his description of the mandible of *Pliosaurus grandis* Owen[33] referred (p. 5) to a median longitudinal rising formed by the interalveolar part of the " symphysis mandibulæ." The right side of the mandible, as illustrated in Plate IV., is abraded to the median line of the tooth row, but on the left side the bases of the alveoli are not exposed. In section the lower moiety of the dentaries is semi-circular, and brings to mind the contours of *Ichthyosaurus.*

It is almost certain that the three teeth preserved on each side do not represent the maximum for the symphyseal region. The right and left series of teeth are parallel, and the preserved contours suggest that in this region the lateral surfaces of the dentaries were also parallel. *Kronosaurus* evidently possessed a very lengthy and powerful mandible, with probably no great width in the posterior portion.

[31] Lydekker, R., Catal. Foss. Rept. Amph., II., 1889.

[32] I am indebted to Professor H. C. Richards for the identification of this material as barytes—" composition $BaSO_4$ (Barium sulphate). The barytes is very pure and very well crystalised.' '

[33] Owen, R., Mon. Brit. Foss. Rept., Kimmeridge Clay, III., 1869.

When first received, this fossil was tentatively labelled by the late C. W. De Vis as an *Ichthyosaurus*, but when studying the large skull of *Ichthyosaurus australis*[34] the writer found that it could not be placed in that family owing to the large socketed teeth and the general structure of the mandible.

Affinities.—In dealing with the difficulty of allocating fragmentary remains of plesiosaurs, S. W. Williston[35] referred to the provisional character of generic names. Owen and Leidy based genera on a single tooth, whilst vertebræ have been frequently used. This Queensland fossil cannot be satisfactorily placed in any genus known to the writer, although it presents some of the characteristics of *Pliosaurus* and allied genera described and illustrated by C. W. Andrews in his fine monographs on the Marine Reptiles of the Oxford Clay.[36] The contours of the teeth and mandible, however, seem to be quite distinct, and the resemblances may be due to homoplasy. Because of its lengthy symphysis it cannot be placed in *Cimoliasaurus*, a genus which, in Williston's words, "has served as a sort of waste-paper basket for the reception of fragments and poorly known forms." For the same reason it is excluded from the Plesiosauridæ as a sub-order. The teeth are by no means so divergent laterally as in Andrews' *Simolestes*, and they are larger, straighter, and not so tapering in the alveolar region as in *Peloneustes evansi*. In the circumstances it seemed necessary to give this gigantic marine reptile from the Australian Cretaceous generic and specific names, and it is firmly believed that when other remains are forthcoming of *Kronosaurus queenslandicus* that this course will be found fully justified. The lengthy symphysis, massive mandible, and very large teeth set in separate sockets, are outstanding features that suggest affinities, however, and the fossil is placed provisionally in the sub-order Pliosauridæ of the Plesiosauria, the latter term being used in preference to Sauropterygia in view of Boulenger's remarks in 1917.[37] Andrews records this sub-order as ranging from the "Lower Jurassic to the Upper Cretaceous of Europe." (1913, p. 1).

Matrix.—This is similar to that associated with other vertebrate remains from the Hughenden district such as *Ichthyosaurus* and *Cratochelone*, described by the writer, being a fine-grained calcareous mudstone.

Other Queensland Cretaceous reptiles include *Plesiosaurus macrospondylus* McCoy and *P. sutherlandi* McCoy,[38] regarded by Etheridge as *Cimoliasaurus*,[39] which were described from vertebræ, the dimensions of which do not suggest so large a reptile as *Kronosaurus*. *Cimoliasaurus leucoscopelus* and *C. maccoyi*, described by Etheridge (1897 and 1904)[40] from interesting remains found at White Cliffs, New South Wales, which had been converted into opal, may be also excluded for the same reason.

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[34] Longman, H. A., Mem. Qld. Mus., VII., 1922, pp. 246-256.

[35] Williston, S. W., Field Columbian Mus., Geol. Sur., 1903, II.

[36] Andrews, C. W., Catal. Mar. Rept. Oxford Clay, pts. 1 and 2, 1910-1913.

[37] Boulenger, P.Z.S., 1917, p. 221.

[38] McCoy, F., Ann. Mag. N. H., XIX., 1867, p. 356.

[39] Etheridge, R., Rec. Aus. Mus., III., 1897, p. 19.

[40] Etheridge, R., Rec. Aus. Mus., V., 1904, p. 306-316.

ON SOME NEW AND LITTLE-KNOWN AUSTRALIAN FULGOROIDEA (HOMOPTERA).

BY F. MUIR, HAWAIIAN SUGAR PLANTERS' EXPERIMENT STATION, HONOLULU, T.H.

(Six Text-figures.)

THE following paper deals with part of a small collection forwarded to me by the Queensland Museum. Some Cixiidæ still await identification as the writer is at work on a revision of the genera of that family. Two species in the Hawaiian Sugar Planters' Association Experiment Station collection are included. The types are in the Queensland Museum unless otherwise stated. Measurements are from apex of head to anus, and from base to apex of one tegmen.

DERBIDÆ.

EOCENCHREA HIVA (Kirk).

Lamenia hiva Kirkaldy. H.S.P.A. Exp. Stn. Ent. Bull. I. (9), p. 404 (1906).

One male and one female from Brisbane (H. Hacker, 5-2-1922). This was described from a single female. The male is similar in structure and colour. Lateral margins of pygofer subangularly produced, ventral margin straight; anal segment small, anus near apex which is rounded; genital styles wide, flat, outer margin slightly concave in outline, inner margin slightly convex, apex but slightly narrower than base, subtruncate.

EOCENCHREA PULLA sp. n.

Male.—Length 1·4 mm.; tegmen 3·2 mm.

In build this species is similar to *E. hiva.* In colour it is all black or very dark brown, with the legs slightly lighter. At the node there is a faintly light spot. Lateral margins of pygofer angularly produced, ventral margin straight; anal segment small, about as long as broad, anus at apex; genital styles broadest at base, gradually narrowing to apex which is rounded.

Described from one male from Hornsby, N.S.W. (F. Muir, January, 1920). Type in Hawaiian Sugar Planters' Association Experiment Station collection, No. 1102.

PHANTASMATOCERA PULCHELLA sp. n.

(Text-figure 1.)

Male.—Length, 2·7 mm.; tegmen 4·2 mm.

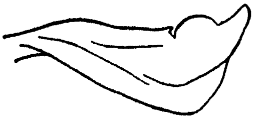
Vertex about as long as broad, lateral margins thick and produced at apex, base and apex roundly emarginate; face widest at base, in profile base considerably produced; antennæ not as long as face, very slightly flattened. Lateral margins of pygofer roundly produced, ventral margin straight; anal segment in dorsal view longer than wide, base slightly wider than apex, anus at apex, apical margin with a small emargination in middle; genital style figured.

Light yellow with white waxy secretion, antennæ and a line in front of eyes black or fuscous, the line continued behind eyes over sides of pronotum and mesonotum; fuscous over abdominal tergites. Tegmina hyaline, white with waxy secretion, fuscous over middle of clavus, Cu and basal median sector into apical Cu M. cells, a black spot on cross vein at apex of M, veins same colour as membrane or slightly yellow; wings hyaline with light veins, opaque with waxy secretion.

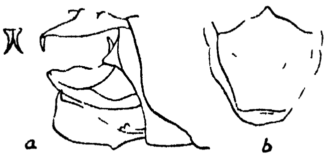
Female similar to male but the antennæ are terete and in profile, the base of face not projecting so much. Hind margin of seventh abdominal tergite roundly produced in middle, with a minute emargination in middle.

Described from two males and two females from National Park, Queensland (*H. Hacker*, December, 1921). Type in Queensland Museum, *Ho. 2752.*

P. pseudopalidocornis was described from one female and the genitalia is very close to *pulchella*, but the colour of tegmina is different.



Text-figure 1 —PHANTASMATOCERA PULCHELLA; left genital style.



Text-figure 2 —HERONAX DUBIUS

(*a*) Lateral view of ♂ genitalia;
(*b*) ventral view of ♀ pregenital plate (7th sternite)

KAMANDAKA LONGMANI sp. n.

Kamandaka, Distant. Faun. Brit. Ind. Rhyn. III, p. 310 (1906).

Eosaccharissa Kirkaldy, Brux. Ann. Soc. Ent. p. 127 (1907). Subgenus of *Kamandaka*.

Chaprina Distant = *Eosaccharissa* Kirk.

Tapoosa Distant = *Eosaccharissa* Kirk.

Nicertoides Matsumura Die Schadl. und Nutzl. insekten v. Zuckerrohr Formosa, p. 14 (1910). Subgenus of *Kamandaka* Dist.

Elsewhere[1] I have tried to define the limits of the three subgenera which I place under *Kamandaka*. The present species falls into *Eosaccharissa* which has the face in profile strongly curved on apical half.

Female.—Length 3·4 mm.; tegmen 6·5 mm.

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[1] Ent. Mo. Mag. iv, (3), Oct., 1918, p. 240.

Stramineous; a dark mark on gena in front of eyes and behind eyes on pronotum, fuscous along the lateral margins of vertex, on front femora and over abdominal tergites. Hind margin of pregenital plate (seventh sternite) angularly produced from near the lateral corners to middle, the sides of the production slightly curved. Anal segment longer than wide, anus in middle, apex round.

Described from one female from National Park, Queensland, 3,000 feet elevation (*H. Hacker*, December, 1921). Type in Queensland Museum, *Ho. 2753.*

HERONAX DUBIUS sp. n.

(Text-figure 2.)

Male.—Length 2·8 mm.; tegmen 6·4 mm.

A very small subantennal process, but no trace of shoulder keel; antennæ shorter than face, wide and considerably flattened. Forking of claval veins about one fourth from apex.

Light brown or yellow; middle of clypeus darker brown; abdominal tergites fuscous over the medio-lateral portion; pygofer dark, anal segment and styles light; front and middle tibiæ with a small dark band in middle and another at apex. Tegmina hyaline with reddish brown markings; a V-shape mark from apex of clavus to fork of Cu to base of M where it continues along R cell to apex, and across to apex of Cu 1 with four round hyaline spots in the middle; dark over apical cells where there is a darker spot over median apical veins; five or six small dark marks in costal cell; veins dark in dark areas, and yellowish in light areas. Wings hyaline, slightly fuscous, veins fuscous, the Cu darker than the others.

Pygofer very short on sides, longer ventrally, ventral margin simple, lateral margins angularly produced on dorsal half; anal segment long, anus one-third from apex in dorsal view; sides very slightly converging to anus, then more strongly so, apex bifurcate and turned ventrad. Genital style broad at apex which is subtruncate, narrow at base, outer margin slightly sinuous, with apical corner produced into a spine, inner apical corner rounded, inner margin nearly straight to near base where it is produced into a small, pointed process curved inward, a small process on the inner surface near base. Aedeagus not dissected out.

Female.—Length 3·2 mm.; tegmen 7 mm.

Similar to male but darker in colour; the apical third of tegmen dark with three light spots along the media.

Pregenital plate 5-sided, base about half the width of apex, straight, apex angular, sides very slightly sinuous, concave in middle.

Described from one male and one female from National Park, Queensland, 3,000 feet elevation (*H. Hacker*, December, 1921). Type and allotype in Queensland Museum, *Ho. 2754.*

The type material of *H. parnassius* Kirk. consists of a single specimen without an abdomen. Although it is considerably lighter in colour than *H. dubius*, yet there is a possibility of their being the same. Males from Cairns; the type locality of *H. parnassius* will decide the question.

The two genera, *Mysidioides* Mats. and *Heronax* Kirk, run near together. In the former there are distinct shoulder keels and subantennal plate, whereas in the latter they are wanting, or only one is present in a very rudimentary form.

ACHILIDÆ.

TROPIPHLEPSIA gen. nov.

A very small costal area at the base of tegmen; apex of clavus in middle; Sc + Rf basad of apex of clavus, M joined to Sc + R forming a common stalk at base, Mf level with node, M 1 and 2 forking considerably basad of apical cross veins, M 3 and 4 forking near to cross veins, M 3 + 4 joining Cu 1 for short distance, Cu f slightly basad of apex of clavus, Cu 1 curved out to meet M 3 + 4; clavus roundly closed, claval vein entering apex of clavus, the second claval vein sinuous and raised into two keels, the large basad of fork the smaller distad of fork. There is also a very slight keel on Cu 1A, Cu stem, M and Sc + R.

Width of vertex at apex four times the length in middle, apex truncate, base slightly and roundly emarginate, apex slightly narrower than base, margins carinate, a median longitudinal carina. Base of frons slightly broader than apex, sides slightly arcuate, carinate continuing on to clypeus, median carina on frons and clypeus obscure, clypeus short. Antennæ small, globose. Pronotum short, anterior margin fitting into base of vertex, posterior margin widely angularly emarginate, a median carina; mesonotum a little wider than long, tricarinate. Legs short, front, and middle femora slightly flattened.

This genus can be recognized by the condition of the second claval vein.

TROPIPHLEPSIA BADIA sp. n.

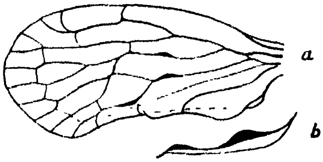
(Text-figure 3.)

Female.—Length 3·5 mm.; tegmen 5·7 mm.

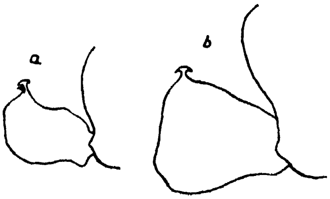
Vertex and nota dark brown speckled with small light spots; frons much lighter speckled with lighter spots; legs and pleura dark brown with lighter spots; abdomen dark brown with the hind margins of tergites light. Tegmina brown, darker over clavus, across the middle, through the subapical cells and at apex, veins dark with light specks along them also extending into the costal and apical cells. Wings light fuscous with darker veins.

Pregenital sternite (seventh) with posterior margin deeply angularly emarginate; ovipositor incomplete, sheaths not completely covering ovipositor; anal segment small.

Described from one female from Brisbane (*H. Hacker*, October, 1917). Type in Queensland Museum, *Ho. 2755.*



Text-figure 3.—TROPIPHLEPSIA BADIA. (*a*) Left tegmen; (*b*) showing raised claval vein.



Text-figure 4.—RIGHT GENITAL STYLE. (*a*) GAETULIA CHRYSOPOIDES; (*b*) G. KOEBELEI.

RICANIIDÆ.

GAETULIA HACKERI sp. n.

Female.—Length, 6·5 mm.; tegmen 8·4 mm.

Vertex distinctly longer than wide, apex narrower than base and angular, base angularly emarginate, sides carinate, disc excavate; frons considerably longer than wide, base narrower than apex, widest slightly before apex, sides straight to near apex then curved, carinate, a strong median carina; clypeus with a median carina, no lateral carinæ. Antennæ small, globose. Pronotum short, hind margin widely angularly emarginate, anterior margin produced into angular emargination of vertex, lateral carinæ large, diverging, not reaching hind margin, median carina obscure; mesonotum slightly longer than wide. Middle of mesonotum broken by pin so carinæ cannot be observed. Venation of tegmen normal, Sc + Rf very slightly basad of Mf and Cu f, apical cross veins of M contiguous, forming a line, those of Sc and R irregular. Costal membrane with ten cross veins. The apex of costal cell not forming a small knob as in *G. chrysopoides* (Walk.).

Apex of abdomen rounded; anal segment small; ovipositor incomplete, sheaths wide, rounded, together forming a hemisphere covering the ovipositor.

Three black, longitudinal lines on frons, one over median carina which extends on to clypeus and the other two between carinæ; lateral carinæ, genæ, and sides of clypeus stramineous; middle of vertex fuscous, carinæ stramineous, nota stramineous with fuscous markings forming longitudinal lines on mesonotum. Abdomen dark stramineous or light brown, lighter on the outer portions of tergites and on hind margins, first visible sternite (true third) light yellow, others fuscous yellow. Tegmina clear hyaline, veins dark brown, costal vein and basal cell lighter, a small dark brown spot at apex of costal cell; wings clear hyaline, veins dark brown, a fuscous mark on apical portion of anal area.

Described from one female from Russell Island, Queensland (*H. Hacker*, 2-12-1921). Type in Queensland Museum, *Ho. 2756*.

This species appears to be more typical of the genus than *G. chrysopoides* (Walk.).

GAETULIA KOEBELEI sp. n.

(Text figure 4.)

Male. Length, 5·3 mm.; tegmen 7·3 mm.

Width of vertex about twice the length in middle, apex slightly angularly produced, base widely angularly emarginate a very faint carina down middle. Width of frons subequal to length in middle, base subequal to apex in width, slightly widest slightly before apex, sides straight to near apex then slightly curved, median longitudinal carina distinct; clypeus with median carina but no lateral carinæ. Pronotum short, anterior margin produced into base of vertex, posterior margin widely angularly emarginate. Mesonotum with three carinæ. Costal area with fourteen cross veins; apex of costal cell slightly enlarged. Sc + Rf and Cuf about level, Mf slightly more distad, apical cross veins gradate, not forming a continuous line.

Light brown, the carinæ of head and thorax lighter. Tegmina hyaline, clear, veins dark brown, a light brown spot at apex of costal cell and another at apex of anal area of wings which are otherwise clear hyaline with brown veins.

The genitalia is very near to *G. chrysopoides* (Walk.), but the genital styles are larger, wider, and have the outer margins straight; the outer apical angle is produced into a bifurcate process like a pick.

Described from one male from Mittagong, N.S.W. (*A. Koebelei*, January, 1905). Type in Hawaiian Sugar Planters' Association Experiment Station collection, No. *1101*. This species differs in colour, size, and genitalia from *G. chrysopoides* (Walk.). From *G. nigrovenosa* Melichar it differs in the wider vertex and frons, in having no small hairs on the frons, in the shape of the apex of costal cell and the genital styles.

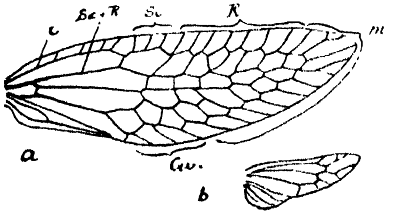
Distant erected the genus *Nurunderia* for *chrysopoides* Walk. on account of a small difference in the shape and size of head, especially the face, but I cannot recognise them as of generic importance.

PARALASONIA gen. nov.

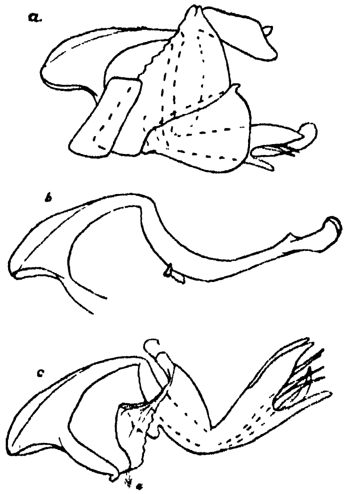
Tegmina narrow, pointed at apex. Costal area short and narrow with three or four cross veins; Sc + R joined to apex of costal membrane, level with apex of clavus, Mf slightly more distad and Cu f slightly more basad; from the costal area to apex of clavus there is a row of apical cells subequal in length. Wings small, one-third the length of tegmen.

Head as broad as, or slightly broader than, the thorax; vertex subquadrate, apex slightly broader than base, slightly rounded with the tumid frons projecting, base slightly excavate, sides straight with slight carinæ, middle without carina. Frons shorter than wide, especially on the middle line, fronto-clypeal suture arcuate, somewhat obscure, sides of frons subparallel to near apex, where they converge slightly, the middle of the frons tumid; clypeus without carinæ. Pronotum short, hind margin widely angularly emarginate, tricarinate, the lateral carinæ curved, not reaching hind margin. Mesonotum broader than long, obscurely tricarinate. Hind tarsi short, basitarsus wide, swollen. Antennæ small, first segment very short, second segment about as long as wide.

This genus comes next to *Lasonia* Melichar. Both of them come near *Gaetulia* Stål. The division of the family into groups on the proportional length and breadth of the frons is unnatural. I believe that a classification based on the venation and checked by a study of the male genitalia will give better results.



Text-figure 5.—PARALASONIA AUSTRALIS. (*a*) Right tegmen; (*b*) right wing; (c) costa; m, media; Cu, cubitus; Sc + R, subcosta and radius joined.



Text-figure 6.—PARALASONIA AUSTRALIS. (*a*) Lateral view of ♂ genitalia; (*b*) lateral view of aedeagus without penis; (c) lateral view of penis.

PARALASONIA AUSTRALIS sp. n.

(Text-figures 5 and 6.)

Male.—Length 4·7 mm.; tegmen 7 mm.

Ochraceous, perhaps when living green or greenish yellow; vertex with a longitudinal median black mark, the apical margin black, curving inward at the margins; frons with a small black mark in middle and a few at the sides, clypeus with four or five fuscous marks on each side; fuscous over carinæ of nota; a small dark spot in the middle of the posterior margin of the abdominal terga. Tegmina and wings clear hyaline, veins black except the claval suture; base of claval veins and basal cell which are colourless or light yellow.

Pygofer laterally compressed, lateral margin subangularly produced; anal segment small, anus at apex; genital styles large, subtriangular, the outer apical corner produced into a small, curved spine, the inner apical corner rounded. Aedeagus complex. The periandrium forming a funnel. The ventral margin of the apex produced into a membranous process, dorsal margin into two large processes, broad at base but pointed at apex, from within the funnel arises two pair of processes, on the left they are both long, slender, straight spines, but on the right one is straight and slender, the other is broader at base and curved; the penis arises in the middle and is a curved, slender tube rounded at apex where it is cleft for a short distance, with a little spine on dorsal surface near apex.

Described from one male from National Park, Queensland (*H. Hacker*, December, 1921). Type in Queensland Museum, *Ho. 2757*.

FIELD NOTES ON *PLATYBRACHYS*, &c. (HOMOPTERA).

By Henry Hacker, F.E.S.

(Plates V.–VIII.)

FAMILY EURYBRACHIDÆ.

PLATYBRACHYS LEUCOSTIGMA (Wlk.).

Eggs.—Length 1·87 mm., width 1 mm.; oval, opaque, smooth, with creamy or pale greenish tint. Examined microscopically there is a small stud-like protuberance at the cephalic end, which is bright yellow in a balsam mount and appears to be of a fibrous nature. Under higher magnification, at the opposite end is a minute colourless protuberance around which small typical micropylar cells can be distinguished. The egg shell is colourless and finely granulated.

The egg patches are conspicuous objects on the trunks of Spotted Gums, *Eucalyptus maculatus*, in this district. During February numerous females were observed ovipositing on the trunks of these trees, generally at a height of three feet to twenty feet or more from the ground. The bark of spotted gum comes off in small scales, leaving oval depressions or scars. These are the places selected by *P. leucostigma* for oviposition. They take up a position in the centre of these hollows during the operation, and place the eggs in neat rows, moving gradually upward as the rows are completed. To place the outside eggs in position, the insect inclines its body from side to side without shifting its central position. When each row is completed she rubs the posterior end of her body over the eggs, covering them with white material from a mass which is situated there. This covering is carried half an inch beyond the eggs on each side, and the method is plainly indicated by the curved striæ across the egg-covers in fig. 2. The eggs are fastened to the bark rather firmly, with their upper ends inclining away from the tree. In the central part of the depression they are placed two deep, and the covering is finished off flush with the surrounding bark.

Nymphs.—The young nymphs emerge through slits in the outer side of the shells which extend from the stud-like protuberance to the middle and push their way through the waxy covering, making ragged tears and cracks. They are pale yellow, with black eyes, and remain motionless in a cluster on the white cover. After a few hours they become grey. On the second day the two long tails characteristic of these and other *Platybrachys* nymphs appear. On the third or fourth day the cluster breaks up, and they scatter over the tree, going up into the higher branches.

The two anal appendages of *Platybrachys* nymphs consist of excremental material. It is forced through two circular plates situated on either side of the last segment. They are divided into many small compartments by fine radiating and concentric lines, somewhat resembling the markings on an *Arachnoidiscus* diatom. These circular plates are present in nymphs of all ages. Even when newly hatched they are present, but are, of course, much smaller and contain fewer compartments. After passing through these plates the excrement is drawn out into long bundles of fine glassy filaments, tightly twisted until near the apical ends, which become untwisted and brushlike. The appendages are constantly growing, but as the loose ends (being very brittle) are continually being abraded, the average length remains constant in the different instars, reaching a maximum of about 12 mm. in the last. After each moult they are left behind on the discarded skins, but others soon appear and gradually lengthen until the maximum is reached.

Platybrachys are double brooded; from eggs hatching in February the winter months are passed in the nymphal state, the adults emerging in spring. From eggs laid in September, the summer months are passed in the nymphal state, the adults appearing in February. The latter is the main brood.

Considering the unprotected condition of these insects in all their stages, and the number of their enemies, both predatory and parasitic, it seems incredible that any can survive, as their only defence seems to be their ability to make quick leaps. It is evident, however, that large numbers do escape, as they are numerous in all our eucalyptus forests.

A Pentatomid bug *Theseus modestus* Stål, both in its larval and adult stages, is very fond of *Platybrachys* eggs. They have frequently been observed on the egg patches with their rostra inserted through the covering. Two Chalcids[1] and a Proctotrypid[2] parasite were often noticed on the egg patches. I have bred out all three from gathered eggs. They are ***Fulgoridicida nigricorpus*** Gir. (Family Encyrtidæ), ***Euryischia unmaculatipennis*** Gir. (Family Elasmidæ), and ***Aphanomerus niger*** Perk.

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[1] Identified by A. A. Girault.

[2] Identified by A. P. Dodd.

Sometimes the egg patches are so situated that in heavy rain they are exposed to streams of water flowing down the tree trunks. If the covering should become injured so that the eggs are exposed, they are quickly discovered by ants, which cut the eggs out and carry them away. On two occasions nymphs were captured carrying white external parasites on the dorsal surface. These left the nymphs soon after, and formed white cocoons, from which emerged small moths (Family Epipyropidæ). Sometimes the adults are heavily infested with Dryinid parasites. There is an adult female specimen before me with six larval sacs of these wasps attached to its abdomen.

I might state that all the activities of *Platybrachys* recorded here, including their emergence, were carried on during the day. The pair of *P. decemmacula* taken in copula were found early in the afternoon. All the egg patches were commenced in the morning and finished before nightfall. The adults are less active towards evening and in dull weather. If disturbed late in the day, instead of immediately flying back to the tree trunks they hide among the grass or dead leaves at the foot.

PLATYBRACHYS LEUCOSTIGMA (Wlk.) = PLATYBRACHYS ÆRATA Dist.

Having collected during two years a long series of *P. leucostigma* Wlk., I was much struck by the fact that they were all females. In a long series of *P. ærata* Dist. taken during the same period all the specimens were males. Although without the proof which a pair taken in copula would give, I feel sure that *P. leucostigma* Wlk. and *P. ærata* Dist. are sexes of the same species. They both occur plentifully on Spotted Gums at the same time. Furthermore, by considering these to be a single species both sexes of every species of *Platybrachys* occuring commonly in the Brisbane district will be accounted for. The list is as follows : —

Platybrachys signata Dist. ♂ ♀.
Platybrachys sanguiflua (Walk.) ♂ ♀.
{ *Platybrachys decemmacula* (Walk.). ♀.
{ *Platybrachys decisa* (Walk.). ♂.
Platybrachys oculata Kirk. Dark var. ♂ ♀.
Platybrachys maculipennis Le Guill. ♂ ♀.
{ *Platybrachys leucostigma* (Walk.). ♀.
{ *Platybrachys ærata* Dist. ♂.

PLATYBRACHYS MACULIPENNIS Le Guill.

The feeding tree of this species is Stringy Bark, ***Eucalyptus acmenioides***. **Instead of ovipositing on the tree trunks like *P. leucostigma*, the female places her egg patches on the leaves. Either surface of a leaf may be used for this purpose,** probably because they all hang vertically. The covers are white and smooth, 18 mm. long and 11 mm. wide. The average cluster contains between twenty and thirty eggs. The eggs are oval, length 1·50 mm.; breadth ·75 mm., and are without the stud-like protuberance possessed by those of *P. leucostigma.*

PLATYBRACHYS DECEMMACULA (Wlk.) = PLATYBRACHYS DECISA (Wlk.)

On February 18th a pair were seen in copula on a tree trunk. They were carefully boxed and brought back alive. When examined it was found that the female was *P. decemmacula,* while the male was identical with a specimen recently returned from the British Museum as *P. decisa.* Both sexes are figured on Plate VII., fig. 12.

OLONIA VIRIDIVENTRIS Stål.

This species is rather local. It has been taken at two places in the Brisbane district, and specimens have been received from Toowoomba and Bribie Island. Its feeding tree about Brisbane is *Acacia cunninghamii* Hook. The eggs have not yet been found, not have the nymphs been recognised with certainty, as nymphs and adults of *Gelastopsis transversa* Walk. and *Dardus abbreviatus* Guér., both occur and feed on the same clumps of Wattles. *O. viridiventris* approaches *Platybrachys* rather than *Olonia* in the shape of the tegmina. The pronotum and scutellum together are shorter than wide, and this places the species in *Olonia.* In *Platybrachys* the pronotum and scutellum together are as long as wide.

The following collecting notes give some particulars about the new species described by Mr. F. Muir in this Part, and may be considered supplementary to that paper.

DERBIDÆ.

PHANTASMATOCERA PULCHELLA Muir.

This species was found in December occurring in large numbers on the long flag-like leaves of *Helmholtzia glaberrima* at Canungra Creek Falls, National Park, 2,000 ft. There is little doubt that this is its feeding plant, as although all the surrounding vegetation was beaten, they were found only on this giant lily. When disturbed they fly rather weakly, either to the nearest foliage, or circle round and return to the lily leaves.

KAMANDAKA (EOSACCHARISSA) LONGMANI Muir, and HERONAX DUBIUS Muir.

Both these species were obtained in dense jungle at the National Park, 3,000 ft. Most of the series were beaten out of dead tree-fern fronds. The dead fronds hang vertically round the stems, and make good shelters during the day for these delicate insects. It is also a favourite hiding place for numerous species of Microlepidoptera, to many of which the Derbiids bear a superficial resemblance.

RICANIIDAE.

GAETULIA HACKERI Muir.

Taken at Russell Island, Moreton Bay, in December. Their feeding tree is Shea-oak, *Casuarina* sp. They hide at the base of the trees during the day. About dusk both nymphs and adults were observed ascending the tree trunks to feed in the higher branches. They seem to prefer young trees about 20 ft. high with a trunk about the thickness of one's arm. The nymphs carry a long tuft of white filaments at the apex of their abdomens.

PARALASONIA AUSTRALIS Muir.

This remarkable-looking insect has been found in two widely separated localities. At Russell Island they were taken at dusk, on *Casuarina*, in company with *Gætulia hackeri* Muir. At the National Park, at a low elevation they were obtained during the day by sweeping grass and herbage under *Casuarina* trees. As in both localities they were found associated with *Casuarina*, this may, I think, be safely considered to be their feeding tree.

EXPLANATION OF PLATES.

PLATE V.

Fig. 1.—***Platybrachys leucostigma*** (Wlk.) Egg patches on the trunk of a spotted gum.

Fig. 2.—***Platybrachys leucostigma*** (Wlk.) Young nymphs emerging from eggs. × 1·75.

Fig. 3.—***Platybrachys leucostigma*** (Wlk.) Young nymphs two days old. × 1·5.

Fig. 4.—***Platybrachys leucostigma*** (Wlk.) Four females on tree trunk, one of which has just completed an egg patch × 6.

PLATE VI.

Fig. 5.—***Platybrachys leucostigma*** (Wlk.) Egg showing stud-like protuberance (Balsam mount). × 40.

Fig. 6.—***Platybrachys leucostigma*** (Wlk.) Newly hatched nymph (Balsam mount) × 23.

Fig. 7.—***Platybrachys leucostigma*** (Wlk.) Nymphs. Last instar. × 2

Fig. 8.—***Platybrachys leucostigma*** (Wlk.) Adult females. × 2·5.

PLATE VII.

Fig. 9.—*Pentatomid bug.* Larva feeding on eggs. × 1.

Fig. 10.—***Platybrachys maculipennis*** Le Guill. Egg patches on leaves of stringy bark. × 1.

Fig. 11.—***Platybrachys maculipennis*** Le Guill. Adults, male and female. × 3.

Fig. 12.—***Platybrachys decemmacula*** (Wlk.) Adults, male and female. × 3.

PLATE VIII.

Fig. 13.—***Olonia viridiventris*** Stål Adults, male and female. × 2·75.

Fig. 14.—***Platybrachys leucostigma*** (Wlk.) Adult males. × 2·75.

Fig. 15.—***Platybrachys leucostigma*** (Wlk.) Last abdominal segment of nymph, showing circular plates × 100.

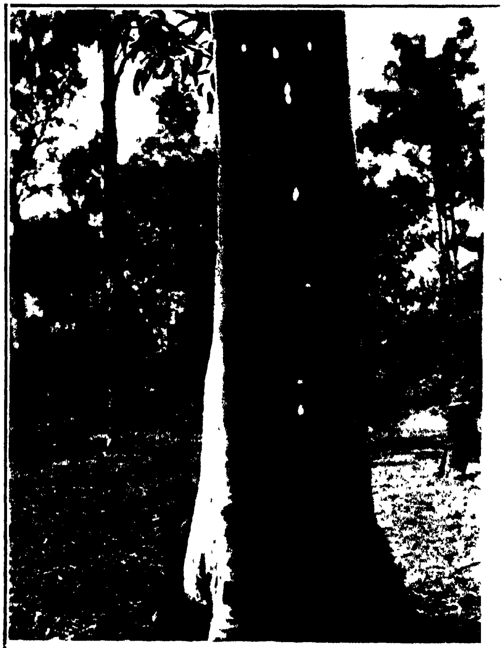

Fig. 1.

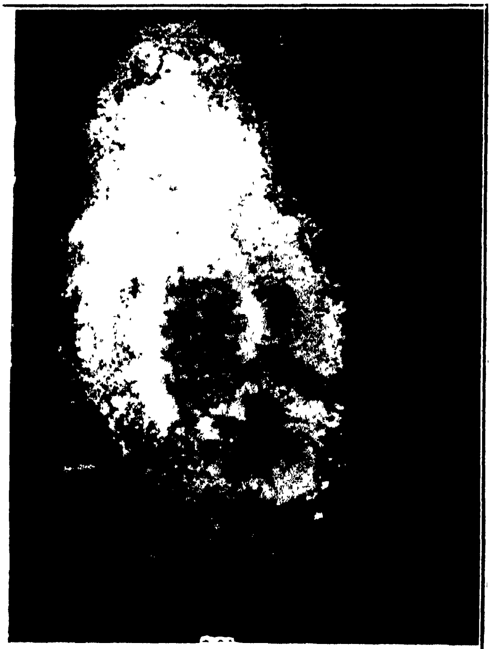

Fig. 3.

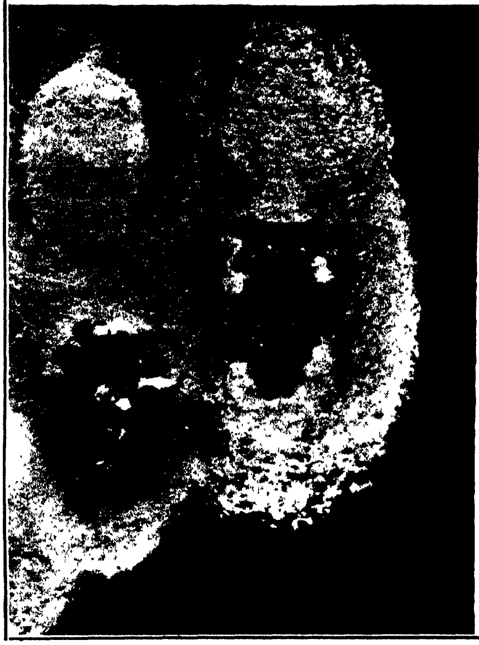

Fig. 2.

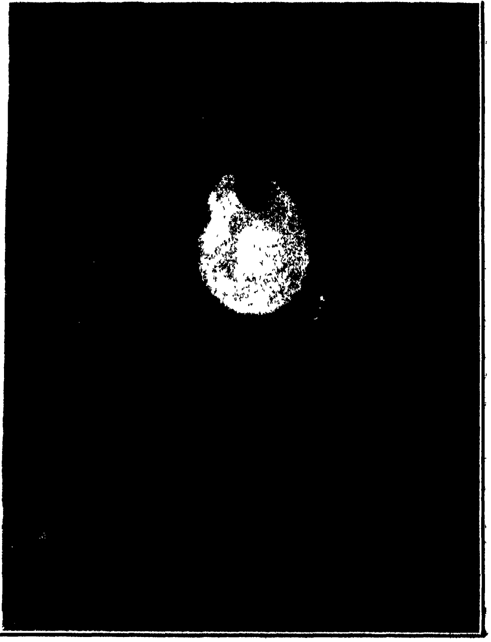

Fig. 4.

Photo., H. Hacker.

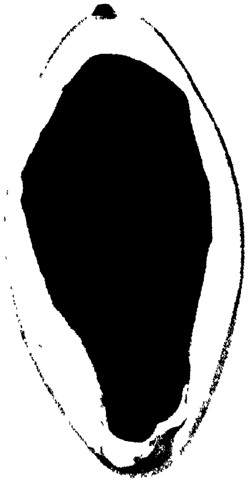

Fig. 5.

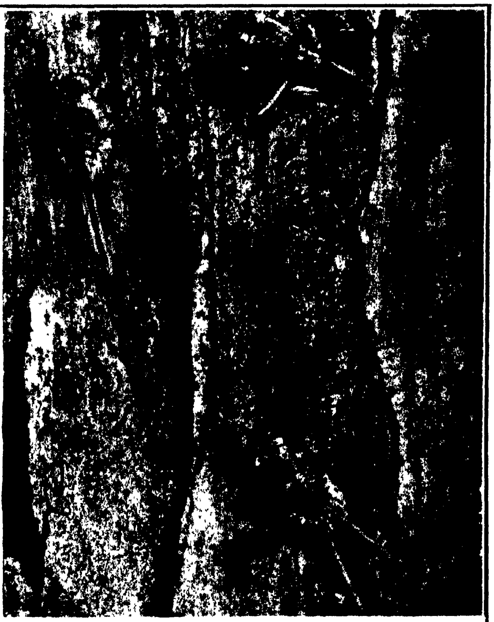

Fig. 7.

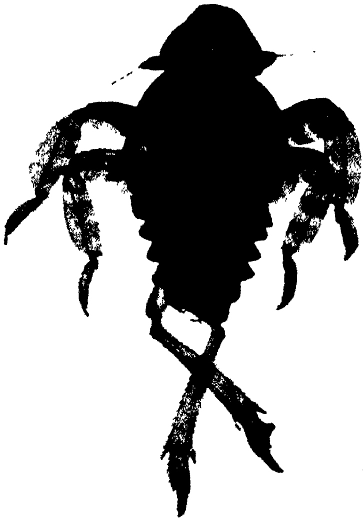

Fig. 6.

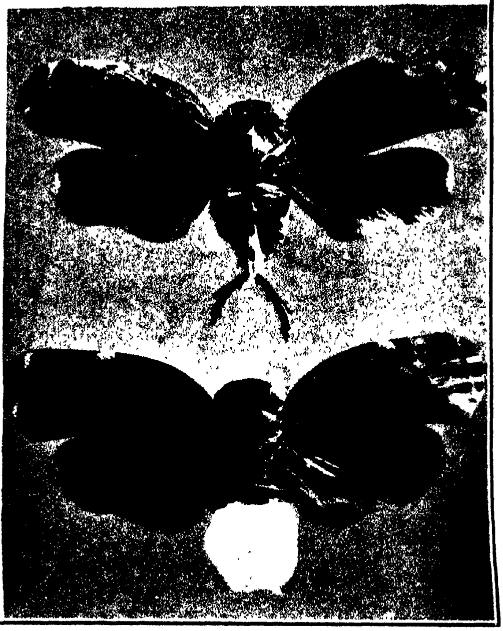

Fig. 8.

Photo., H. Hacker.

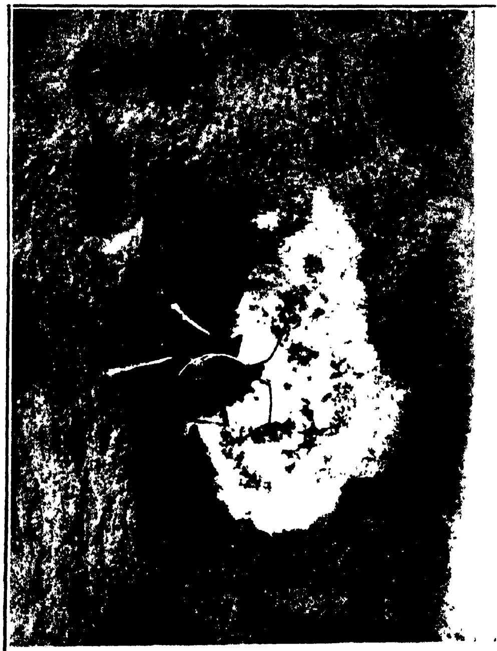

Fig. 9.

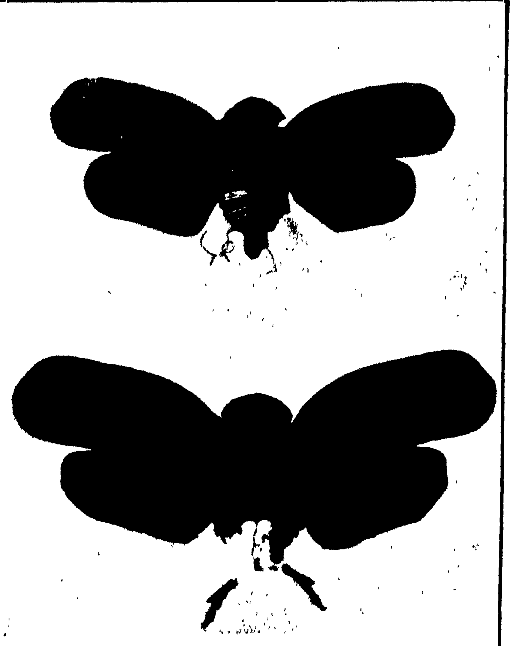

Fig. 11.

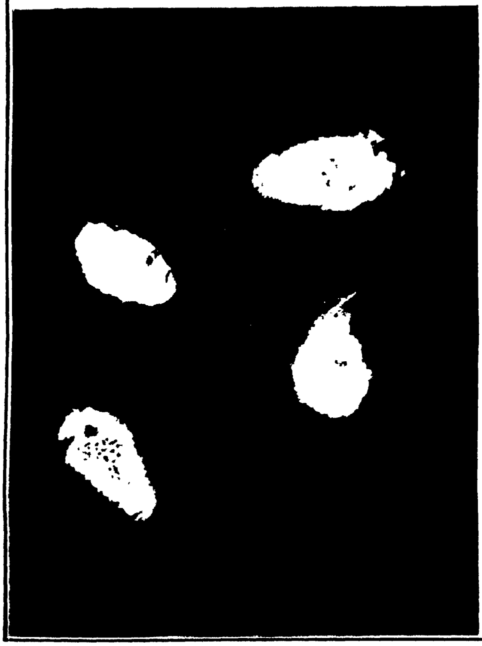

Fig. 10.

Fig. 12.

Photo., H. Hacker.

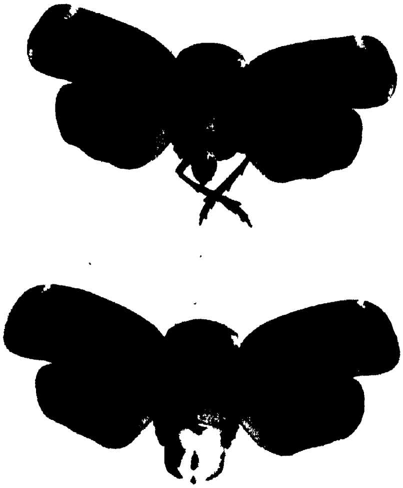

Fig. 13.

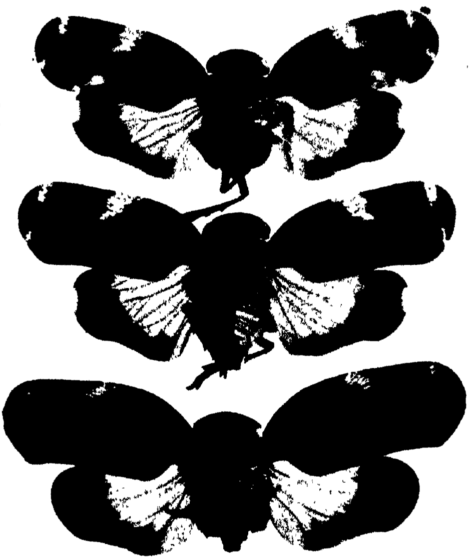

Fig. 14.

Fig. 15.

Photo., H. Hacker.

THE EARLY STAGES OF *DANAIDA AFFINIS* Fabr.

By Henry Hacker, F.E.S.

(Plate IX.)

During a holiday spent on Bribie Island in January, 1922, large numbers of *Danaida affinis* were seen on the wing. By watching the females, many of which were ovipositing, good series of eggs, larvæ, and pupæ were obtained. Their food-plant, *Vincetoxicum carnosum* Benth., was found growing on the edges of salt creeks and swamps, always among reeds, to which the plants cling for support.

Eggs.—The eggs are cream-coloured, conical, with many rows of longitudinal ridges, between which are fine transverse striæ. They are deposited singly on the leaves. Compared with eggs of *D. archippus*, they are slightly more elongate, and have more pointed apices.

Larvæ.—The full-grown larvæ are smooth and cylindrical. Dorsally on the second, fifth, and eleventh segments respectively there are situated three pairs of tapering appendages, of which the basal third is red, the apical two-thirds black. Head black, shining, carrying dorsally two semicircular narrow white bands, front with a small white spot. Body with blue ground colour,[1] the lighter markings on the dorsal surface consisting of two yellow spots, and three white spots, arranged in two transverse rows, behind which are three transverse interrupted light stripes on each segment; lateral markings consist of three or four small light spots on the anterior segments, increasing to eight or ten on the others. There is also a small elongate light spot on the outer side of each thoracic leg and abdominal proleg.

Pupæ.—Short and stout, the greatest circumference being a ridge round the abdomen ornamented with a band of bead-like golden spots; there are four golden spots near the anterior end; colour pale green. The pupa is suspended by a short black stalk, from the base of which on the inner side extends a black bifurcated mark, beyond which there are a pair of small black tubercles.

The insects when about to pupate invariably attach themselves to the reed stems, instead of their feeding plants, as they afford them a stronger support.

Parasites.—A number of living pupæ were brought back to Brisbane. From several of these, Chalcid parasites emerged singly from each, by cutting a circular hole in the side. A. A. Girault, to whom they were submitted, states that this is a new variety of *Chalcis brisbanensis* Gir., which he is naming *Chalcis brisbanensis danaidæ*.

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[1] In spirit specimens, or inflated skins, the blue ground colour changes to purplish red, and the yellow spots become whitish.

Distribution.—The first larvæ were obtained on Russell Island in December 1921, on the edge of a small salt-water lagoon, on the same food plant, and under similar conditions to those taken on Bribie Island. Waterhouse and Lyell give a wide range of localities for this butterfly, extending from Cape York to Sydney on the east coast; also Derby (W.A.), Darwin, Melville Island, etc. The distribution of *Vincetoxicum carnosum* coincides with that of the butterfly. Mr. C. T. White, Government Botanist, who kindly identified the plant, states:—"It has a wide range, including the islands of the Gulf of Carpentaria, Port Curtis, Moreton Island, Rockingham Bay, and extends in New South Wales to the Port Macquarie district."

EXPLANATION OF PLATE IX.

Fig. 1.—*Danaida affinis*, Fabr. Eggs × 11.

Fig. 2.—*Danaida affinis*, Fabr. Larvæ and Pupa × 1.

Fig. 3.—*Danaida affinis*, Fabr. Female ovipositing.

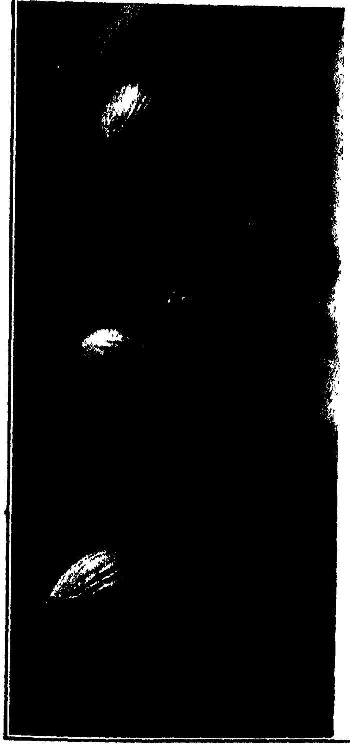

Fig. 1.

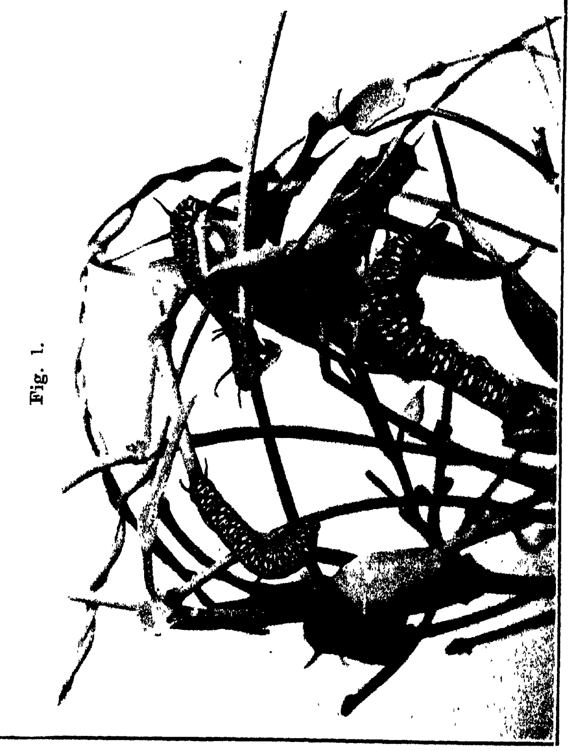

Fig. 2.

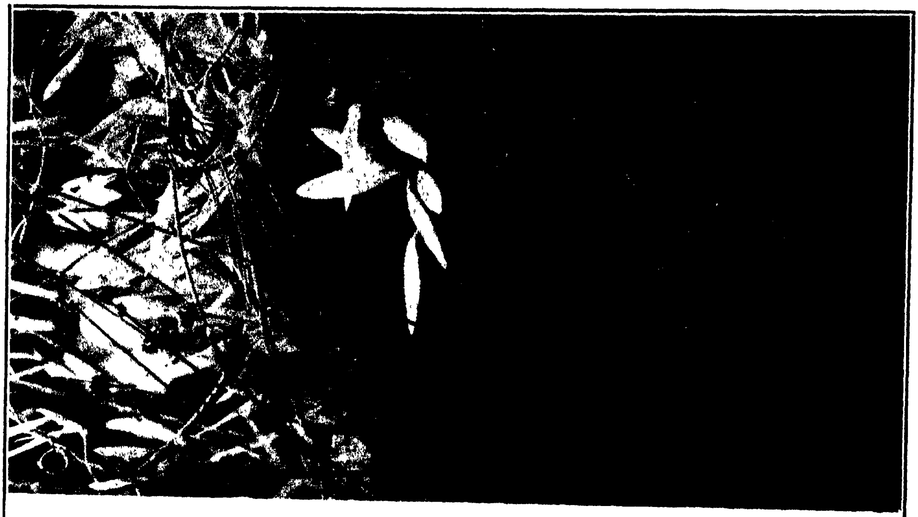

Fig. 3.

Life History of *Danaida affinis* Fabr.

Photo., H. Hacker.

Face page 44.

THE AUSTRALIAN SPECIES OF *AULACOPHORA* (COLEOPTERA, CHRYSOMELIDÆ).

BY ARTHUR M. LEA, F.E.S.

(*Contribution from the South Australian Museum.*)

THE genus *Aulacophora* is abundantly represented in the Malay Archipelago, New Guinea, the warmer parts of Australia and elsewhere. Many of the species are widely distributed and variable; on the other hand, some at first glance appear to be closely allied or identical with others from which they may be readily distinguished by male characters of the antennæ and abdomen.

Baly in 1886[1] gave a table of most of the then-known species, with notes and descriptions, supplementing these in 1888[2].

Allard in 1888[3] gave tables of the genera and species of the Aulacophorites, with a list of the species, many synonyms being noted.

Baly in 1889[4] in criticising Allard's paper remarked: "This paper bears marks of hasty compilation and of insufficient study of the various specific forms; numerous errors have consequently crept in." He gave many instances of these.

As some of the species are very destructive, it appears desirable to comment upon each of those recorded for Australia, some undoubtedly in error. With one exception all the Australian species occur in Queensland, but of these several extend to other States and a few to New Guinea and elsewhere.

A. abdominalis Fabr. Baly[5] was the first to record this species as Australian. In Gemminger and Harold's catalogue the species is recorded from Europe, Africa, and Asia, and seven synonyms are noted. In Allard's catalogue *A. excisa* of Baly is added, and it is also recorded from New Zealand, &c. Baly considered Allard's identifications erroneous. Blackburn stated of *A. palmerstoni*: "Mr. Jacoby informs me that this is not distinct from *A. abdominalis* Fabr."[6] There are specimens of the species in the South Australian Museum from Queensland, Northern Territory, North-western Australia, and Aru; it differs from *A. wilsoni* by the transverse impression of pronotum undulated in middle, the scutellum pale, and more of the under-surface and legs pale, but the dark parts of the legs and abdomen vary in extent and degree.

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[1] Baly, Journ. Linn. Soc., Zool., xx, pp. 1-26.

[2] Baly, *loc. cit.*, pp. 175-185.

[3] Allard, Ann. Soc. Ent. Fr., pp. 305-332.

[4] Baly, Trans. Ent. Soc., pp. 297-307.

[5] Baly, *loc. cit.*, 1886, p. 14.

[6] Blackburn, Trans. Roy. Soc. S. Aust., 1898, p. 233.

A. affinis Montr. This species was originally recorded from New Caledonia, and the elytra were described as reddish, with two black bands, one at the base the other at the apex. Allard considered that *A. deplanchei* and *A. approximata* were synonyms, but Baly denied this. The species probably occurs neither in Australia nor New Guinea. Jacoby in commenting on it[7] described some specimens from Somerset which he thought possibly belonged to the species, but which differed from the description in having the tips of the elytra pale, and the pygidium black. The species he identified was also standing in the Blackburn collection so named, and there are several close in appearance to it, but readily distinguished by the abdomen of the male.

A. analis Weber. Baly in commenting on the genus said[8]: "The first six species here described have simple antennæ in both sexes," *A. analis* being described as No. 1. Presuming Baly's identification to be correct, the species has no connection with *A. hilaris*, as identified in Australia, whose antennæ are not simple in the male. Moreover the nearest locality to Australia that he gives for the species is Celebes, so that it probably does not even occur in Australia. Allard's record of it from Adelaide was, no doubt, based upon *A. hilaris.*

A. armigera Baly. Described from a single female from Murray Island, a small island slightly more than one hundred miles east of Thursday Island. Four females from Roper River (Northern Territory), and one from St. Joseph's River (New Guinea) possibly belong to the species. The former appear like small ones of *A. abdominalis*, but have the pygidium ridged towards apex, with the apex itself produced as a small tooth of varying sharpness; one or two apical segments of the abdomen are more or less flavous, but only parts of the tibiæ and tarsi are infuscated, the femora being entirely pale. The one from New Guinea has the pygidium almost equilaterally triangular, with the tip produced as a short pointed process; its hind legs are black, middle ones not much paler, but front ones with only the tibiæ and tarsi slightly infuscated; the apical segment of its abdomen is semicircularly notched.

A. australis Blackb. After its description Blackburn incorrectly noted this name as a variety of *A. analis*, but later correctly as a synonym of *A. olivieri*.

A. borrei Baly. Proposed by Baly[9] as a substitute for *A. pectoralis* Jac.

A. cartereti Guer. Recorded as from Carteret Harbour, New Holland, but really in the Solomons; so that the name should be expunged from Australian lists. Allard recorded it from New Holland with *A. instabilis* of Baly as a synonym; Baly denied the synonymy, but recorded the species from New Guinea. A female from the Madang district of New Guinea possibly belongs to the species. Its legs are entirely pale and under-surface pale except that part of the abdomen is infuscated, but the upper surface of its pygidium is black. It is certainly close to some forms of *A. instabilis*, of which there are many specimens in the South Australian Museum from New Guinea.

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[7] Jacoby, Ann. Mus. Civ. Gen., 1886, p. 57.

[8] Baly, *loc. cit.*, 1888, p. 175.

[9] Baly, *loc. cit.*, 1889, p. 303.

A. cucullata Blackb. The only known species from Australia with the base only of the elytra black; the male (unknown to Blackburn) has simple antennæ, but the apical segment of its abdomen has a wide notch extending almost to its base.

A. cyanura Hope. The original description is "*Testacea, capite thoraceque maculatis elytrisque apicibus cyaneis.*" Length 4½ x 2¼ lines. It is not referred to by Baly in the papers quoted, and Gemminger and Harold record it from Assam The species, if it is really an *Aulacophora* (it was described as an *Auchenia*) probably does not occur in Australia. Allard states that it is a synonym of *Phyllobrotica lunata* Redt., an Asiatic species.

A. denticornis Blackb. Although Blackburn described the dark parts of the elytra as "rubropurpureis" and again as "purplish red," on a female (marked as a cotype) the elytral markings are almost black. On four specimens two of each sex, from Cairns, the markings are quite black. The abdomen of the male is somewhat as on the male of *A. hilaris*, but the part between the notches is wider, and the notches are narrower, although of about the same depth. Both sexes may be distinguished from those of *A. hilaris* by the apex of elytra being widely black, instead of just tipped with blackish.

A. duboulayi Baly. I have seen no specimens of this species, but the brassy-green elytra and male with the third to fifth joints of antennæ dilated should render it easy of recognition.

A. fallax Weise. Five specimens from the Cairns district appear to belong to this species; they have the general appearance of *A. borrei*, and the males have a similar trough-like abdominal cavity; but are distinguished by the tarsi and antennæ. On this species the basal joint of the front tarsi scarcely differs sexually—on that one the basal joint of the male is almost twice as large as that of the female. The antennæ are also conspicuously longer and thinner than those of *A. borrei*, and are pale throughout. On four specimens the labrum is entirely black, on one of the males it is infuscated only at the apex; the pale median fascia of the elytra is slightly larger than the black ones, but appears to have decidedly larger punctures. This, however, is due to "water-logging." The pale apical portion is not half the length of the fascia before it, and is narrowly continued around the sides. The black fasciæ are sometimes narrowly interrupted at the suture.

A. hilaris Boi. The original description is . "*Lutea, utrinque nigro bicincta*"; with a translation into French, the locality being noted as New Holland. Short as the description is it applies exactly only to the species subsequently named *A. olivieri* by Baly and *A australis* by Blackburn. It has been (correctly, I think) applied to our most destructive species of the genus, with two large black spots on each elytron and the male with the third to fifth joints of antennæ dilated and the following ones infuscated. The apical segment of its abdomen has a deep and not-very-narrow notch, extending on each side of the middle to near the base, the part between the notches shallowly depressed and the depression continued to the base itself. The basal spots on the elytra are narrowly separated at the suture, and the postmedian ones rather more widely there; the tip is also narrowly blackish. Allard, without giving evidence for his identifications, noted *A. nigrosignata* Baly, *A. pectoralis* Jac., and *A. insularis* Jac. as synonyms or probable synonyms; but Baly disagreed, apparently on good grounds, although he believed the type to be lost.

A. melanura Oliv. Recorded by Olivier from New Holland, by Boisduval from New Guinea, and by Allard from Borneo. It is described as a pale species with the elytra black except for parts of the lateral margins. It probably does not occur in Australia, or at least needs confirmation before being included in our lists.

A. nigrivestis Boi. Recorded by Boisduval as from New Holland. Baly in describing *A. lewisi*[10] from China said it was possibly described from the female of *A. nigrivestis*. Subsequently[11] he extended the range of the species to India and the Malay Archipelago, but without again mentioning *A. nigrivestis*. Allard recorded *A. nigrivestis* from New Guinea, noting *A. lewisi* as a synonym. There are five specimens, from the Madang district of New Guinea, that appear to belong to the species. The elytra and abdomen are black in all of them. On two the metasternum is also black; on the others it is pale. The extent of infuscation of the hind legs varies. Its right to a position in Australian catalogues needs confirmation.

A. occipitalis Baly.[12] Blackburn of this species wrote[13]: "I have an example taken near Port Darwin which is quite identical with specimens of this species from New Guinea." In his collection there were two specimens, from Darwin and Cairns, standing as *A. occipitalis* and another from St. Joseph's River, New Guinea; the Darwin and New Guinea specimens are males, and agree with Baly's description of the abdomen, but their antennæ are very different from his description, the third to fifth joints being only slightly thicker than those of the female, instead of much wider and conspicuously and acutely produced on one side of apex. Numerous specimens from the Madang district of New Guinea agree perfectly with Baly's description, but the species occurs also at Somerset and Thursday Island. The species identified by Blackburn as *A. occipitalis* is here named *A. tetrastictoptera*.

A. olivieri Baly. The description of *A. olivieri* agrees perfectly with the species here regarded as *A. hilaris*.

A. palmerstoni Blackb. A synonym of *A. abdominalis*.

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[10] Baly, *loc. cit.*, 1886, p. 24.

[11] Baly, *loc. cit.*, 1888, p. 179.

[12] Baly, *loc. cit.*, p. 184.

[13] Blackburn, Trans. Roy. Soc. S. Aust., 1892, p. 237.

A. pectoralis Jac. As *A. pectoralis* was previously used by Chapius. Baly altered Jacoby's name to *A. borrei.*

A. punctata Boi. The description of this species, "*Rubro lutea, tenuissime punctata, pectore pedibusque nigris,*" may have been founded upon one of the varieties of *A. abdominalis.*

A. relicta Boi. The description of this species reads as if founded upon *A. abdominalis,* some specimens of which have only the hind legs partly dark. Allard noted that *A. duvivieri* was a synonym of the species, which Baly, apparently with good reason, denied.

A. richmondensis Blackb. Allied to *A. hilaris,* but dark elytral markings not interrupted at the suture, the tips not dark, and abdomen entirely pale, and in the male with a deep median excavation. Although Blackburn wrote: "The antennæ are not different in the sexes," those of the male are slightly stouter than those of the female. Of the five specimens before me four have the metasternum black or blackish ; on the other it is as pale as the abdomen. Blackburn considered it was distinct from *A. pectoralis* Jacoby (now *A. borrei* Baly) because Jacoby used the expression "the prothorax impunctate" ; I believe it to be that species, however, because the prothorax from some directions appears almost impunctate, and Jacoby frequently noted species as having parts impunctate when small punctures are really present. Weise records the species from several fresh localities in Queensland under the following heading :— CERATIA (ORTHAULACA) BORREI Baly (*pectoralis* Jac., *richmondensis* Blackb.).[14]

A. scutellata Boi. Allard considered this species was identical with *A. palustris* Perr. (which Baly states is a *Monolepta*) and *A. wallacei* Baly. It was reported from the Pacific Ocean by Boisduval, by Gemminger and Harold from Australia, and by Allard from Mareton Bay (no doubt Moreton Bay being intended). If really Australian the description "*Lutea, scutello nigro, abdomine pectoreque nigro-fuscis*" may well have been founded upon *A. wilsoni,* which occurs near Brisbane, as well as in New South Wales.

A. serena Weise. Referred by Weise to the subgenus *Orthaulaca* of *Ceratia* ; the structure of its antennæ was not described, but they are apparently somewhat as in *A. hilaris,* from which, as from *A. tetrastictoptera,* the species should be distinct by its entirely pale abdomen, except for a spot on the pygidium.

A. wilsoni Baly. In general appearance like small *A. abdominalis,* but with the scutellum dark.

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[14] Weise, Arkiv för Zool., Stockholm, Band 15, No. 12, 1923, p. 86.

TABLE OF AUSTRALIAN SPECIES OF *AULACOPHORA*.

A¹. Elytra entirely pale.
  *a*¹. Scutellum dark .. .. *wilsoni* Baly.
  *a*². Scutellum pale.
    *b*¹. Pygidium acutely pointed .. .. *armigera* Baly.
    *b*². Pygidium less-acutely pointed .. .. *abdominalis* Fab.
A². Elytra dark only at base .. .. *cucullata* Blackb.
A³. Elytra with two black fasciæ or four large black spots.
  B¹. Antennæ of male with third to fifth joints wide and produced to one side
    *c*¹. Head with a large black spot on each side of base .. .. *occipitalis* Baly.
    *c*². Head immaculate.
      *d*¹. Apical third of elytra black .. .. *denticornis* Blackb.
      *d*². Apical third pale (the tip excepted) .. .. *hilaris* Boi.
  B². Antennæ simple in both sexes
    C¹. Head with a large black spot on each side of base .. .. *tetrastictoptera* Lea.
    C². Head immaculate.
      D¹. Pygidium black .. .. *apiciventris* Lea.
      D². Pygidium pale.
        E¹. Apical segment of abdomen of male with space between notches transverse .. .. *medioflava* Lea
        E². Apical segment of male with two deep notches, the space between with a trough-like cavity almost to base
          F¹. Basal joint of front tarsi of male almost twice as wide as that of female, part of antennæ black .. .. *borrei* Baly
          F². Basal joint similar in sexes, antennæ longer and thinner than in *A. borrei*, and entirely pale .. .. .. *fallax* Weise.

Names not noted in above Table.

palmerstoni Blackb., *punctata* Boi., *relicta* Boi. (= *abdominalis* Fab.).
pectoralis Jac., *richmondensis* Blackb. (*borrei* Baly).
australis Blackb., *olivieri* Baly (= *hilaris* Boi.).
scutellata Boi. (? = *wilsoni* Baly).
affinis Montr., *analis* Weber, *cartereti* Guer., *cyanura* Hope, *melanura* Oliv. (not Australian).
duboulayi Baly. *Not tabled, as unknown to me; a new section* "A⁴. Elytra entirely dark" *would be required for it, to which A. nigrivestis* Boi., if really Australian, could be added.
serena Weise. Not tabled, as unknown to me; it should probably be associated with *A. hilaris*.

AULACOPHORA TETRASTICTOPTERA sp. nov.

♂ Flavous; each side of base of head, four large spots on elytra, metasternum and much of abdomen black.

Head with a median line becoming foveate where it traverses the interocular groove. Antennæ scarcely passing the hind coxæ and fairly stout but simple. Prothorax with transverse impression deep and almost straight; with dense and small punctures, larger about front angles than elsewhere. Elytra not transversely impressed near base, sides somewhat dilated from near base, punctures rather small but sharply defined. Apical segment of abdomen large, with a deep trough-like median cavity, bordered on each side, but not to its base, by a narrow groove. Length, 5-6·5 mm.

♀ Differs in having somewhat thinner antennæ, apical segment of abdomen smaller and simple, and its apex not notched.

Hab.—Northern Territory (Blackburn's collection), Darwin (W. K. Hunt), Roper River (N. B. Tindale); Queensland: Cairns district (Blackburn's collection and E. Allen); New Guinea: St. Joseph's River (Sir Wm. MacGregor). Type, I. 4068 in South Australian Museum; cotype, C.2751, in Queensland Museum.

In general appearance strikingly like *A. hilaris* and *A. occipitalis*, but at once distinguished by the simple antennæ of the male. On each of those species the third to fifth joints of the male are strongly dilated and produced to one side. The two large spots on each elytron are basal and postmedian, somewhat rounded and touch neither suture nor side; the tips are no darker than the adjacent surface but have a curious watery appearance. The basal segment of abdomen and parts of the second, and in the male the trough-like cavity are more or less flavous. The pygidium is black but normally concealed. On the elytra of some specimens the punctures, although really rather small, appear large, but this is due to "waterlogging."

AULACOPHORA MEDIOFLAVA sp. nov.

♂ Bright orange-flavous, median fascia of elytra paler; labrum, two wide elytral fasciæ and legs, except coxæ and knees, black; antennæ more or less deeply infuscated, some of the basal joints paler.

Head with a subfoveate expansion in middle of interocular groove. Antennæ long, thin, and simple. Prothorax with transverse impression wide and feebly curved; with small punctures, but becoming larger in all the angles. Elytra not transversely impressed near base; punctures small. Abdomen with a short incision on each side of apex, the space between them slightly depressed and about twice as wide as long. Length, 7-9 mm.

♀ Differs in being more robust, antennæ somewhat shorter, the apical segment of abdomen not incised and its tip gently rounded.

Hab.—Northern Queensland (Blackburn's collection), Cairns district (E. Allen, G. E. Bryant, and F. P. Dodd), South Johnstone River (H. W. Brown). Type, I. 4740, in South Australian Museum; cotype, C.2749, in Queensland Museum.

Larger than most of the Australian species and with the under-surface entirely pale. The abdominal incisions of the male are shorter than in the allied species, and the space between them is but feebly concave. The basal fascia of the elytra occupies rather more than one-fourth of the surface, and is scarcely or not at all interrupted at the suture. The pale fascia is slightly longer, the following black one is about as long, and leaves a small apical portion pale (smaller and not incurved as on *A. borrei*), a narrower lateral portion, and usually the suture (very narrowly). The elytral punctures are really all small, but on some specimens, owing to "waterlogging," they appear of moderate size on the pale parts.

AULACOPHORA APICIVENTRIS sp. nov.

♂ Flavous; labrum, two wide elytral fasciæ, a spot on each side of apex of abdomen, pygidium and parts of legs black, most of antennæ infuscated.

Head with interocular groove narrow and curved, a small fovea in its middle. Antennæ long, thin and simple. Prothorax with transverse impression deep and slightly curved; punctures minute, but becoming of moderate size in front angles. Elytra moderately dilated posteriorly, not transversely depressed near base; punctures minute but rather sharply defined. Apical segment of abdomen rather large, a deep cavity commencing rather narrowly at base and dilated to apex, a narrow incision on each side of its apical two-thirds. Length, 6-8 mm.

♀ Differs in being somewhat more robust, antennæ somewhat shorter and less infuscated, apical segment of abdomen simple, its tip rounded, and the black part not interrupted in middle

Hab.—Northern Queensland (Blackburn's collection), Cairns district (E. Allen and J. A. Anderson), Bowen (Aug. Simson). Type, I. 15645 in South Australian Museum; cotype, C.2750, in Queensland Museum.

The type was standing in the Blackburn Collection as *A. affinis*, apparently owing to Blackburn's acceptance of Jacoby's surmise; but *A. affinis* probably does not even occur in Australia and in any case there are too many discrepancies from Montrouzier's description for this species to be treated as such. Except for a very small apical portion the elytra are divided into three zones of about equal extent, a flavous median one and two black ones. The hind legs are blackish except that the coxæ and knees are pale; the other legs have the femora entirely pale. The infuscation of the antennæ is not very deep; on one female the three median segments of abdomen are partly infuscated.

ON A COLLECTION OF SYRPHIDS FROM QUEENSLAND WITH DESCRIPTIONS OF A NEW GENUS AND OF EIGHT NEW SPECIES.

BY A. KLÖCKER, COPENHAGEN, DENMARK.*

(Plate X.)

THROUGH the kindness of Mr. Heber A. Longman, Director of the Queensland Museum, Brisbane, I got about two years ago an interesting collection of Syrphids from that country. They were collected by Mr. H. Hacker. During the long journey some specimens, however, were quite damaged, so that they could not be included in the following list.

PSILOTA Meigen.

Of this genus the collection contains at least four species, three of which are new to science. They are all wanting the vena spuria or it is extremely indistinct.

In the diagnosis of the genus, Meigen (System. Beschreib., III, 256, 1822) does not mention the vena spuria. In fig. 20 on plate 29 he figures the genotype, *Ps. anthracina* Meig., but no vena spuria is to be seen in that figure. As, however, it is also wanting in many other of Meigen's figures, where it ought to have been drawn, this circumstance is of no significance. Macquart (Hist. nat. des Ins., Dipt., Suites a Buffon, 1, 1834) also gives a figure of this species, fig. 19, plate 12. Here the vena spuria is very prominent; but as generally his figures are more or less incorrect, we cannot rely upon this figure.† Williston (Synops. North Amer. Syrphids, 1886) says: "False vein obsolete," and Verrall (Brit. Flies, VIII, 1901): "Vena spuria very faint." I myself have not seen any specimen of *Ps. anthracina*.

1. PSILOTA VIRIDIS Macq.

Dipt. exot., Suppl. 2, 62, 1847, Pl. ii, fig. 12.

2 ♀♀; Brisbane, 26-9-1916 and 7-11-1917.

2. PSILOTA RUBRA n. sp.

♀. Eyes with short white hairs. Antennæ brownish, 3rd joint above blackish, somewhat elongate. Vertex and frons black with bluish tinge; the former with black, the latter with short white hairs and an indistinct longitudinal furrow. Cheeks with whitish hairs. Mouth rather protruding. Thorax and scutellum bluish black; the latter with a distinctly marked, elevated margin. Abdomen red or yellowish red, with short white hairs. Front and middle legs yellow, except the two last joints of tarsi, which are brownish. Hind legs: femora rather thickened, below with somewhat strong short bristles; they are black, or only the distal half is black, the proximal half yellowish; tibiæ somewhat curved, brownish; tarsi brownish, metatarsi dilated. Wings hyaline; stigma and the subcostal cell yellowish. The marginal crossvein and the 4th longitudinal vein are forming an obtuse angle, the top of which has a little spur. Alulæ white, with very long marginal hairs. Halteres white. Long. 6-7 mm.

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* EDITOR'S NOTE.—I regret to state that Dr. A. Klöcker has passed away since this paper was written. This information was received in correspondence from Dr. K. L. Henricksen, of the Zoological Museum, Copenhagen.

† In the said fig. 19 the marginal crossvein goes directly to the margin of the wing, instead of going to the 3rd longitudinal vein and uniting with it.

2 ♀♀; Brisbane, 12-9-1916 and 26-9-1916.

This species cannot be confounded with any other species on account of its red abdomen.

3. PSILOTA TRISTIS n. sp.

♀. Quite black with a faint bluish tinge. Eyes with not very long white hairs, especially on the lower two-thirds of the eye. Antennæ: the first two joints black, the 3rd brownish black, somewhat elongate. Vertex and frons with blackish, rather short hairs, the latter with a faint longitudinal furrow. Face and cheeks with white hairs. Mouth much protruding. Thorax with short black hairs, especially on the front part, and with white hairs on the sides. Scutellum with a distinctly marked elevated margin with a few bristles. Abdomen with rather short greyish hairs, especially on the side margins. Legs black, the knees brownish; front and middle tibiæ in the proximal half brownish. Hind femora only a little thickened, with short bristles below. Wings with a faint greyish tinge. The marginal crossvein as in *Ps. rubra.* Alulæ white, halteres yellow. Long. 8 mm.

1 ♀; Brisbane, 26 9-1916.

It differs from *Ps. coerulea* Macq. in the colour of the abdomen, in having the two first joints of the antennæ black (in *coerulea* they are "fauves"), and in the shape of the hind femora, about which Macquart in his description of *coerulea* says: "cuisses postérieures renflées, avec une échancrure près de la base."

4. PSILOTA HIRTA n. sp.

♀. Quite black, with a very faint dark bluish tinge. Eyes with long white hairs, especially on the lower half. Antennæ blackish brown; the 3rd joint somewhat elongate. Vertex and frons with rather long blackish brown hairs; the latter with a very faint, almost not visible longitudinal furrow. Face blackish, greyish pruinose. Mouth rather protruding. Thorax with blackish brown hairs on dorsum and with white hairs on the sides. Scutellum with yellowish grey hairs. Abdomen densely pubescent of yellowish grey hairs, especially on the side margins, where they are more whitish. On the side margins of the 1st and 2nd segments the hairs are much longer. Femora blackish with brown knees; front and middle tibiæ and tarsi brownish; hind tibiæ and tarsi blackish. The hairs on the legs whitish or greyish. Alulæ whitish, halteres greyish. Wings with brownish tinge. Long. 8 mm.

1 ♀ : Brisbane, 20-9-1916.

This very hairy species is easily distinguished by its brownish wings.

EMMYIA n. gen.

♂. Eyes strongly hairy. Eye suture at least three times as long as vertical triangle. 3rd joint of antennæ about twice as long as broad. Frons not conically protruding (difference from *Pipiza*). Epistoma not hollowed below the antennæ and without central knob. Front mouth edge only a little protruding. The upper marginal crossvein slightly curved and with the upper angle acute (difference from *Pipizella*). Middle crossvein before mediastinal vein; it is perpendicular on 3rd and 4th longitudinal vein and very near base of discal cell (the distance from base is as long as the length of the middle crossvein itself). Genitalia very small (difference from *Penium*). Middle coxæ and hind trochanteres without spine (difference from *Cnemodon*). Hind femora not thickened. Vena spuria rather distinct. The whole body densely haired.

Genotype: *Emmyia queenslandica.*

The genus belongs to the *Pipiza* group, and is chiefly agreeing with *Penium.*

5. **EMMYIA QUEENSLANDICA** n. sp. Fig. 1, Plate X.

♂. Eyes with very long pile; the hairs on the upper half greyish brown, on the lower half whitish. Antennæ blackish; the 3rd joint somewhat elongate. Arista bare, a little longer than the 3rd joint, at the base of which it is inserted. Head broader than thorax. Vertical triangle rather little, with long black hairs; frons shining black in the middle and with very long black hairs here; on the sides with grey down. Epistoma and cheeks with grey down and longer hairs of the same colour; in the middle of the face from the antennæ down to the mouth a blackish shining stripe; front parts of mouth and its environs shining black. Thorax and scutellum shining black, finely punctate, with long greyish hairs, especially on the sides and the margin of scutellum, which is distinctly marked and elevated. Abdomen black, punctate, shining; on the sides of 1st, 2nd and 3rd segment with long whitish hairs; on the sides of the following segments the hairs are mingled with darker ones; on dorsum all hairs are black, rather short, so that dorsum looks velvet black. Legs black, the knees and tibiæ pitchy, with long and short white hairs. Hind femora not thickened. Alulæ whitish, halteres yellow. Wings hyaline, with a faint brownish tinge on the costal part. Long. 10 mm.

1 ♂; Brisbane, 24-9-1918.

MELANOSTOMA Schiner.

6. **MELANOSTOMA APICALE** Big.

Annal. Soc. Entom. France, sér, 6, IV, 85, 1884.

2 ♂♂; Brisbane, 3-4-1917.

They agree perfectly with Bigot's description. He refers with doubt the species to *Melanostoma*, but there is no doubt about that it belongs to this genus. The species was hitherto only known from New Caledonia.

SYRPHUS Fabricius.

7. **SYRPHUS VIRIDICEPS** Macq.

Dipt. exot., Suppl. 2, 61, 1847.

4 ♂♂; Brisbane, 24-7-1914 and 10-10-1916.

Macquart's description is rather short; de Meijere has therefore (Tijdschr. v. Entom., LI, 299, 1908) given a supplement to it. Macquart says: "Pedibus fuscis, genubus flavis," de Meijere: "Vordere Beine gelb, die Schenkel an der Wurzel, die Vorderschenkel fast bis zur Mitte schwarz, auch die Tarsen dunkler, bräunlich, desgleichen die Vorderschienen oben an der Spitze. Hinterbeine schwarzbraun, die äusserste Spitze der Schenkel und die Schienenwurzel gelb." Thus, the two descriptions do not quite agree. In my specimens the two front and the two middle legs are yellow with the basal half of the femora black; for the rest as de Meijere says. According to this author the pile on thorax is yellow; in my specimens it is grey. For the rest the description agrees with my specimens, so I think they belong to this species.

8. **SYRPHUS** sp.

1 ♀; Brisbane, 10-3-1912.

I have not been able to identify this species.

9. **SYRPHUS BALTEATUS** de Geer, var. **ALTERNANS** Macq.

Dipt. exot. II, 2, 89, 7, 1842.

2 ♀♀; Brisbane, 19-4-1918.

SPÆROPHORIA St. Fargeau and Serville.

10. **SPHAEROPHORIA KERTESZI** n. sp.

♂. Antennæ yellow. Face yellow, sides somewhat opalescent; facial tubercle brownish; mouth parts brown. Thorax: dorsum shining greenish black, with very indistinct greyish longitudinal stripes on middle; the yellow side margins continuous to the scutellum; pleuræ whitish yellow. Scutellum yellow, with yellow hairs. Abdomen: 1st segment black, 2nd segment black, with a straight, broad, dark yellow transverse band, going close along the hind margin, only leaving a narrow black space. The other segments dark yellow or brownish yellow, brownish towards the end. Venter brownish yellow, darker behind. All legs light yellow, hind tarsi brownish. Wings somewhat greyish. Long. 7-9 mm.

The male genitalia rather small. Abdomen somewhat longer than the wings.

3 ♂♂; Brisbane, 15-11-1916.

I have pleasure in naming this species in honour of the famous Hungarian dipterologist Dr. Kertèsz.

XANTHOGRAMMA Schiner.

11. XANTHOGRAMMA GRANDICORNE Macq.

Dipt. exot., II. 2, 16. Pl. XVI, fig. 7, 1842.

4 ♀♀; Brisbane, 24-9-14 and 4-12-1918.

I have compared these specimens with two others in my collection from Hawaii, and they perfectly agree. Macquart's figure shows no facial tubercle at all, though he writes: " Face jaune, à proéminence peu distincte." He also figures the arista as being about 5 times as long as the 3rd antennal joint. A correct figure is found in Grimshaw: Fauna Hawaiiensis, III, 19, I, pl. II, fig. 7-10, 1901; he gives the profile of the head and a figure of the antenna with the arista inserted about in the middle of the 3rd joint and only half as long as this.

12. XANTHOGRAMMA sp.

1 ♀; Brisbane, without date.

The transverse yellow bands on abdomen are not interrupted in the middle. I have not been able to identify it.

ERISTALIS Latreille.

13. ERISTALIS AGNO Wlk.

List. Dipt. Brit. Mus., III, 630, 1849.

1 ♂; Brisbane, 26-12-1915.

14. ERISTALIS COPIOSA Wlk.

Insecta Saunders, Dipt., I, 249, 1852.

3 ♂♂; Brisbane, 15-9-1916, 16-9-1916, and 26-9-1916, and 1 ♀; Brisbane, 3-10-1916.

The habitat has hitherto been unknown, at any rate until 1909.

15. ERISTALIS FLAVOHIRTA n. sp. Fig. II.

♀. Eyes bare. Antennæ reddish; the 3rd joint suborbicular, brownish above. Arista bare, rather long. Head a little broader than thorax. Vertex black, with dense black pile, continued at each side along the eye margins. Frons with very short yellow hairs, among which long black erect hairs. Face with long whitish yellow hairs. Epistoma with a median black bare stripe, not hollowed below antennal tubercle; mouth not protruding. The hind margin of the head covered with dense yellow pile. Thorax velvet black, densely covered with short yellow hairs and somewhat longer black ones. Pleuræ with long yellowish hairs. Scutellum as thorax but with longer black hairs, especially on the margin, where they are bristle-like. Abdomen as long as head and thorax together. The ground colour is velvet black. 1st segment with 2 small yellow spots, 1 at each front corner; 2nd segment with 2 great yellow triangular spots, only leaving the hind margin of the segment and an hour-glass shaped spot in the middle black; 3rd segment with 2 yellow subtriangular sidespots, going along the front margin almost until the middle, and along the two-thirds of the side margin, leaving the hind margin and a triangular spot in the middle of the segment black; 4th segment as the 3rd, but the spots are smaller; 5th segment quite yellow. Abdomen is covered with long yellow and black hairs, the former on the yellow parts, the latter on the black ones. The hairs are especially long at the front corners of the 2nd segment. The underside of thorax is black with yellow hairs, and the venter is yellow with long yellow hairs. Front legs: femora reddish with or without a brown base; tibiæ dark brownish or blackish. Middle legs: femora yellowish, with long whitish hairs; tibiæ brownish black or proximally reddish; tarsi brownish black. Hind legs: quite brownish black, or femora with reddish base, not thickened. The proximal half of the wings with a brownish tinge. Long. 8 mm.

2 ♀♀; the labels are marked: Hamlyn-Harris, Dunk Island, May 1914.

This species is a very characteristic one; head, thorax, and scutellum look as if they were powdered with yellow. The abdominal spots are of a bright lemon-yellow colour.

16. ERISTALIS HERVE-BAZINI n. sp. Fig. III.

♀. Eyes bare, with many small black points, which are confluent on the upmost part of the eye. Antennæ reddish; 3rd joint suborbicular. Arista bare. Head as broad as thorax. Vertex black, with black pile. Frons with grey down and black pile; in the middle a velvet black, short, longitudinal narrow stripe; on each side a velvet black, triangular spot touching the inner eye margin and the upper end of the middle line. Antennal tubercle rather prominent. Face and cheeks with white down. Thorax grey; dorsum with 4 longitudinal opaque black stripes of about equal width; the two middle ones a little nearer to each other than the two lateral ones. Scutellum blackish brown or brown; the broad hind margin yellowish brown, with white pile. Abdomen about as long as thorax and scutellum together. 1st segment grey, the others opaque black with shining hind margins; 2nd segment with a transverse grey band, interrupted in the middle and dilated at the side margin; 3rd segment with 2 trapezoidal grey spots touching the front margin; 4th segment with 2 smaller spots of the same colour and shape; 5th segment with 2 very small spots of the same colour. Fore and middle legs: femora blackish with whitish tips; tibiæ with proximal half whitish, distal half more or less blackish; tarsi with the two first joints yellowish white, the others blackish. Hind legs: femora blackish, the tip somewhat brownish; tibiæ with the proximal half brownish with more or less whitish, and distal half or tip blackish; metatarsi whitish, the next joint a little darker, the others blackish. | Wings hyaline; veins brownish; stigma somewhat greyish, with a small black spot at each end, the proximal one being twice as large as the distal one. Long. 11-12 mm.

2 ♀♀: Brisbane, 3-10-1916 and 4-12-1918.

This very characteristic species, which belongs to the subgenus *Lathyrophthalmus Mik*, is easily distinguished from the related species by the shape and colour of the abdominal spots and the colour of the legs.

I have pleasure in naming this species in honour of the famous French dipterologist M. le prof. Hervé Bazin.

17. ERISTALIS PUNCTULATA Macq.

Dipt. exot, Suppl. 2, 59, 53, 1847.

1 ♀: Duaringa, June, 1917, and 1 ♂; Brisbane, 4-11-1914.

18. ERISTALIS TENAX L.

Syst. Nat., Ed. X, 591, 21, 1758.

1 ; Brisbane, 15-11-1918.

HELOPHILUS Meigen.

19. HELOPHILUS GRISEUS Wlk.

Entom. Magaz., II, 472, 1835.

1 ♂: Brisbane, 20-8-1918.

20. HELOPHILUS HILARIS Wlk.

List. Dipt. Brit. Mus, III, 605, 1849

2 ♀♀; Brisbane, 15-11-1916 and 4-12-1918.

The habitat was hitherto, at any rate until 1909, unknown.

SYRITTA, St. Fargeau and Serville.

21. SYRITTA HACKERI n. sp Fig IV.

♂. Eyes facets small, larger in the front part of the eye. Antennæ yellow; 3rd joint ovate. Vertex bluish black, shining. Face almost straight, with whitish yellow down. Thorax blackish, at the front margin with 2 small greyish triangular spots; shoulders and sides pale yellow, the pale yellow extending into a small triangle on the dorsal side; 2 pale yellow, oblong spots at each side of the hind margin. Scutellum blackish, the hind margin a little paler. Abdomen on the dorsal side velvet black on segments 1, 2, and 3; 4th and 5th segments bluish black, shining. 1st segment on the sides below margin yellow; 2nd segment at each side along the side margin with a yellow sub-semicircular spot; on 3rd segment at each side a triangular yellow spot with the groundline on the front margin, where the spots are meeting each other in a point; 4th segment with a very narrow yellow hind margin. Fore and middle legs yellow, the latter with a little black marking at the proximal end of the femora. Hind femora very thick, with several shorter and longer spines below, some of which are oblique; the femora are reddish, blackish at the tip. Hind tibiæ bent at base in an obtuse angle and then curved, with a blunt projection on the inner side a little below middle; they are blackish with a broad reddish ring about in the middle. Hind tarsi brownish; 1st joint dilated. Wings shorter than abdomen; they are hyaline with a somewhat greyish tip. Stigma yellowish grey. Vena spuria very distinct. Long. 11·5 mm.

1 ♂; Brisbane, 12-11-1918.

I have named this species in honour of the entomologist, Mr. H. Hacker, who has collected the specimens named in this list.

22. SYRITTA ILLUCIDA Wlk.

Proc. Linn. Soc. London, IV, 121, 95, 1860.

2 ♂♂; Brisbane, 26-11-1912 and 15-11-1916.

It is with some doubt that I refer this species to *illucida* Wlk. Walker describes, l.c., only the female. My two specimens agree rather well with his description and I therefore identified them as this species. Later on I received from Dr. Kertèsz the male determined by him. In this specimen, the yellow brownish crossband on the abdomen is not interrupted as in the female. As both my specimens have this crossband interrupted, I am not sure what is the right. Perhaps the species may vary in this direction. I have not seen any description of the male.

S. illucida is known from Celebes and Formosa.

MICRODON Meigen.

23. MICRODON sp. (?).

1 ♂; Caloundra, November, 1912.

24. MICRODON sp (?).

1 ♀; Stradbroke Island, 17-9-1915.

I have not been able to identify these species as they are rather worn.

Besides the above-named species there are also in the collection 2 *Psilota*, which are too much damaged to be identified or described, and a specimen without a head, which I cannot refer to genus.

Explanation of Plate X.

Fig. 1.—*Emmyia queenslandica* Klöcker. Head from side.

Fig. 2.—*Eristalis flavohirta* Klöcker. ♀ 1.—Head, thorax, and abdomen. 2.—Head from side.

Fig. 3.—*Eristalis Herve-Bazini* Klöcker. ♀ 1.—Thorax and abdomen. 2.—Head from side.

Fig. 4.—*Syritta Hackeri* Klöcker. ♂ 1.—Head, thorax, and abdomen. 2.—Head from side. 3.—Hind leg.

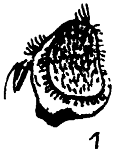

Fig. 1.

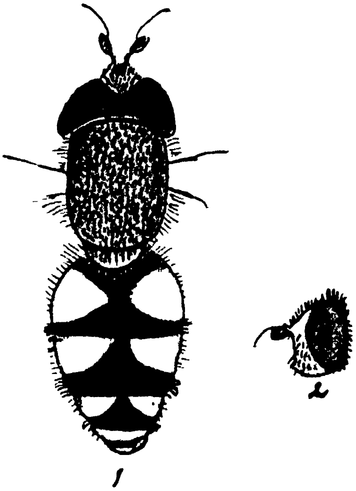

Fig. 2.

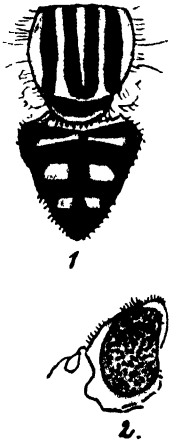

Fig. 3.

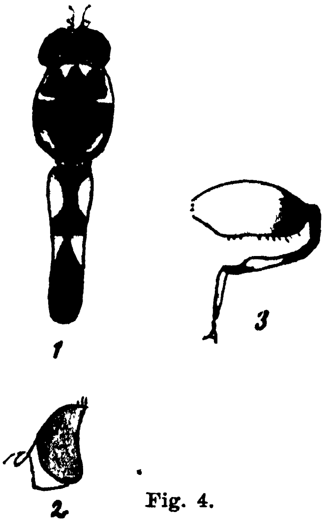

Fig. 4.

Queensland Syrphids.—A. Klöcker.

ICHTHYOLOGICAL ITEMS, No. 2.

BY ALLAN R. McCULLOCH, ZOOLOGIST, AUSTRALIAN MUSEUM.

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(Plates XI.-XIV.)

Holotypes, Pleisotypes, Orthotypes, Lectotypes and Logotypes, and a whole array of other types, are terms of more or less exact meaning which have been established to meet the requirements of modern taxonomy. Some are ill-defined, and have been used only by the authors responsible for them, but others are gradually gaining wider acceptance as their value becomes more evident. In the "old days," types were things of elastic quality, one specimen or a dozen being inconsequently accepted as the basis of a species, regardless of their source, though they may have come from one or a dozen different localities. The exactitudes of Gill, Bleeker, and other forerunners of more methodical classification were disregarded by most ichthyologists of their day, and were often enough discountenanced as being unworthy of the consideration of naturalists. But with the ever-increasing accumulation of data the necessity for greater accuracy became apparent, and the designation of types demanded more careful consideration than had been previously afforded it.

As noted in the introduction of Part 1 of this paper (Mem. Qld. Mus. V, 1916, p. 58), an appreciation of the value of typical specimens of fishes deposited in the various Australian Museums has developed considerably within recent years, and the specimens upon which Castlenau, Macleay, De Vis, and Johnston founded their species have been segregated from the less valuable collections in which they were lost, and duly registered, labelled, and otherwise treated as befits their great importance. Too often the actual types have disappeared, some having decayed, while the identity of others has been lost for want of a label or some distinguishing mark. But improved conditions of these collections is steadily reducing the number of lost types, and the elimination of the comparatively few fishes described by Australian authors which remain known only by their names and ludicrously meagre descriptions is gradually approaching completion.

The following paper deals with several species of fishes which have been stumbling-blocks to all who have had occasion to consider them. I am indebted to the Committee of Management of the Macleay Museum for the loan of several holotypes of species of Carangids described by the late Sir William Macleay in the early eighties of last century, which have not been recognised by any later writers. These are here redescribed and figured. The rich collection of fishes in the Queensland Museum has been recently rearranged and classified by Mr. T. C. Marshall, to whom I am indebted for much help in the rediscovery of types of specimens described by Messrs. De Vis and Ogilby, which, as noted in the following pages, have been so imperfectly labelled that their identification has been fraught with considerable uncertainty. Mr. H. A. Longman, as Director, has afforded me every assistance, and it is entirely due to his interest that I am able to submit these conclusions. Finally, I have had much valuable help from my assistant, Mr. G. P. Whitley, in the preparation of the figures and arrangement of the paper for press.

FAMILY MACRORHAMPHOSIDÆ.

MACRORHAMPHOSUS ELEVATUS Waite.

(Plate XI., fig. 1, and Text-figures 1-4.)

Centriscus scolopax Johnston, Proc. Roy. Soc. Tasm. 1882 (1883), p. 123, and 1890 (1891), p. 34. *Id.* Macleay, Proc. Linn. Soc. N. S. Wales ix., 1884, p. 42 (not *Balistes scolopax* Linné).

Macrorhamphosus scolopax var. *elevatus* Waite, Mem. Austr. Mus. iv. 1, 1899, p. 59, pl. vii., fig. 1. *Id.* Fowler, P. Acad. Philad. 1907 (1908), p. 425.

Macrorhamphosus elevatus McCulloch, Biol. Res. "Endeavour" i. 1, 1911, p. 23, fig. 8. *Id.* Regan, Ann. Mag. Nat. Hist. (8) xiii., 1914, pp. 17, 19.

Centriscus scolopax var. *elevatus* Kershaw, Vict. Nat. xxiii. 6, 1906, p. 125.

Macrorhamphosus gallinago Ogilby, Proc. Roy. Soc. Qld. xxi., 1908, p. 6.

Macrorhamphosus lancifer Ogilby, New Fish. Qld. Coast, 1910, p. 90.

? *Macrorhamphosus robustus* Ogilby, New Fish. Qld. Coast, 1910, p. 91.

Variation.—In my first report upon the fishes taken by the "Endeavour," I have referred to the great range of variation exhibited by a series of over 80 specimens of this common species. Large examples are always considerably deeper than smaller ones, but apart from a marked change of form which takes place as the fish increases in size, there is also much individual variation. This affects the relative proportions of the depth as compared with the length, and causes striking differences between two specimens of similar size. The accompanying figures illustrate the extent of this variation and depict one of the more slender and the deepest of my specimens, between which is an unbroken series of intermediate forms.

The length and position of the second dorsal spine is likewise variable, being longer than the head in some (Fig. 2), but little longer than the snout in others (Figs. 3-4) and shorter than it in one example. In deep specimens it is inserted midway between the hinder margin of the eye and the end of the middle caudal rays, but is farther forward in slender examples, being midway between the hinder orbital margin and the base of the tail.

Finally, the snout is much longer proportionally in some than in others.

The accompanying figures and tabulation of variable characters not only illustrate the remarkable range of variation, but also prove that specimens which have been described as separate species by Ogilby are really referable to the one species.

MACRORHAMPHOSUS ELEVATUS. MEASUREMENTS OF SELECTED SPECIMENS, SHOWING RANGE OF VARIATION.

Data of Specimen	Total Length	Length to Hypural Joint	Depth before Insertion of Ventral Fin	Head	Eye	Post-orbital Part of Head	Snout from Anterior Border of Eye	Second Dorsal Spine from Basal Plate	Locality
Lectotype of *elevatus* (Pl. XI., fig. 1)	141 mm.	125 mm.	39 mm.	60 mm.	10.5 mm.	8.5 mm.	40 mm.	45 mm.	Off Newcastle Bight, New South Wales, 28-40 faths.
? Holotype of *gallinago* (Text-fig. 1)	121	106	30	51	10.5	7.5	32	34	Tweed River Heads
? Holotype of *robustus* (Text-fig. 3)	150	134	45	59	11	10	38	40	Queensland
Holotype of *lancifer* (Text-fig. 2)	115	98	33	47	9	7.75	30	48	Off Cape Moreton, Queensland, 70-75 fathoms
Slender specimen here figured (Text-fig. 4)	97	86	21.5	40.5	7	6.5	27.5	30	Off Eden, New South Wales; 25-30 fathoms
"Thetis" specimen identified as *gallinago* by Ogilby	136	113	33.5	54	10	8	35	36.5	Off Broughton Island, New South Wales, 29-48 fath.
"Thetis" specimen figured in Biol. Res. Endeavour, i, 1911, p. 24	93	81	20	40	6.66	6½	27	27	Off Broughton Island, New South Wales, 29-48 fath.
"Thetis" smallest specimen	66	57.4	17.7	28.7	6	4.9	17.7	24.1	Off Cape Three Points, New South Wales; 32-40 faths.
Most slender specimen examined	81	71	16.5	34	6	6	22	18	Maroubra Bay, Sydney

An analysis of these proportions shows that the depth at the insertion of the ventral fin varies from 4·3 to 2·9 in the length to the hypural joint; the head is 2·0 to 2·1 in the same. The length of the second dorsal spine varies from 1·8 in the head in some specimens to others in which it is 0·9 longer than the head; and the snout is 1·4 to 1·6 in the head. The post-orbital portion of the head is 1·0 to 1·4 in the eye.

Synonymy.—The specimen characterised and figured by Waite as *Macrorhamphosus scolopax* var. *elevatus* was one of eleven trawled during the "Thetis" Expedition, 4–6 miles off Newcastle Bight, New South Wales, 28-40 fathoms; 2nd March, 1898. All were registered under one number, *I. 3970*, and marked "type" collectively, but only one corresponds in measurements and proportions with the figure. It has therefore been selected as the lectotype, and is again figured here (Pl. XI., fig. 1).

The name *M. gallinago* Ogilby, was based upon a specimen 123 mm. long from the Tweed River Heads, New South Wales. It was deposited in the collection of the Amateur Fishermen's Association of Queensland and entered in the Association's register by Ogilby as "No. *639 Macrorhamphosus gallinago* Ogilby. Loc. Tweed Heads. Type." Mr. T. C. Marshall of the Queensland Museum recently searched through the A.F.A.Q. collection at my request, and found a bottle numbered 639, but labelled as "*M. elevatus*; loc. Tweed Heads." It contained three specimens of *Macrorhamphosus*, one of which corresponds in measurements and proportions with Ogilby's description of *M. gallinago,* and is evidently the holotype of that species. It is here figured (Text-fig. 1). I have already shown that *M. gallinago* is synonymous with *M. elevatus* (Biol. Res. Endeavour i. 1, p. 23). It may be noted that "the length of the body" in Ogilby's description is really the length from the end of the snout to the hypural joint; the length of the "trunk and tail" as measured by him excludes the caudal fin.

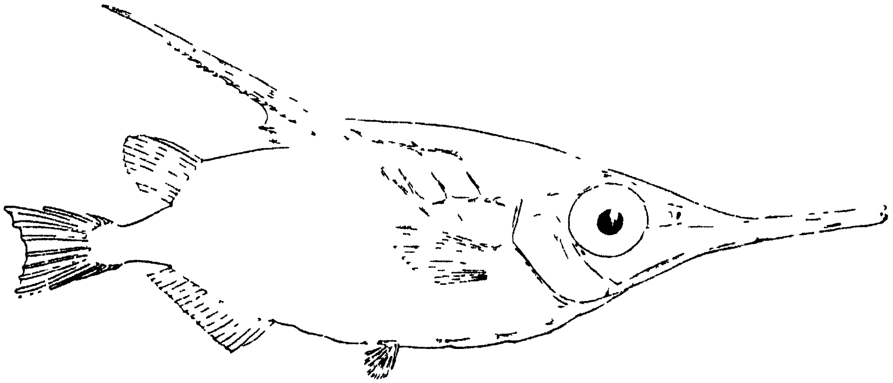

Fig. 1.—? Holotype of *M. gallinago* Ogilby, from Tweed River Heads, New South Wales; 121 mm. long.

The description of *M. lancifer* Ogilby was prepared on board the trawler "Endeavour" "from a single specimen, 118 millim. long, taken in 73 fathoms on fine sand and mud, 36 miles S. 12° W. from Cape Moreton." The specimen was afterwards forwarded to the Australian Museum with the rest of the "Endeavour" collections and registered *E. 2971* and, though unlabelled, is readily identifiable by its length and locality. It is figured (Text-fig. 2). It must be noted that the position quoted by Ogilby is incorrect, the trawl being lowered north-east instead of south-west of Cape Moreton. Regan (*loc. cit.* 1914) has already suggested the identity of *M. lancifer* and *M. elevatus*, and I find no stable characters to distinguish them.

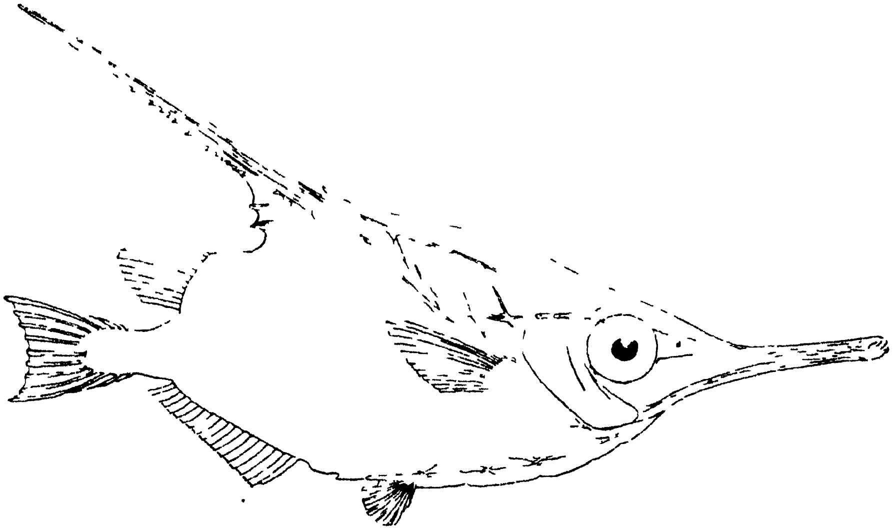

Fig. 2.—Holotype of *M. lancifer* Ogilby, from off Cape Moreton, 118 mm. long.

While describing *M. lancifer*, Ogilby established the "provisional" name *robustus* "for a Moreton Bay specimen, 6 in. long, characterised by its very stout and deep body," having the "depth of body 2·8 in its length." No specimen so labelled can now be found, but among the types of Ogilby's species which were deposited in the Queensland Museum by the Amateur Fishermen's Association of Queensland is an example registered *I. 1562*. This was entered in the register by Ogilby on 13th October, 1913, as *Macrorhamphosus*, but beyond stating that it was an A.F.A.Q. type he gave no other data as to species or locality. Though labelled by him later as *M. gallinago*, its proportions are very different to those of the *gallinago* form, and it cannot be the type of that species. It corresponds in a general way with the briefly characterised *M. robustus*, however, and may be reasonably regarded as the specimen upon which that name was based. It is figured in Text-fig. 3.

I agree with Regan that the name is merely referable to another variation of *M. elevatus.*

Distribution.—Southern Queensland, New South Wales, Victoria, and Tasmania. The specimens here figured are from the following localities :—

Plate XI., fig. 1.—4-6 miles off Newcastle Bight, New South Wales, 28-40 fathoms ; 2nd March, 1898. Lectotype of *M. elevatus.*

Text-fig. 1.—Tweed River Heads, New South Wales. ? Holotype of *M. gallinago* Ogilby.

Text-fig. 2.—36 miles N.E. of Cape Moreton, Queensland, 70-75 fathoms ; 3rd September, 1910. Holotype of *M. lancifer* Ogilby.

Text-fig. 3.—Queensland. ? Holotype of *M. robustus* Ogilby.

Text-fig. 4.—3-4 miles off Eden, New South Wales, 25-30 fathoms.

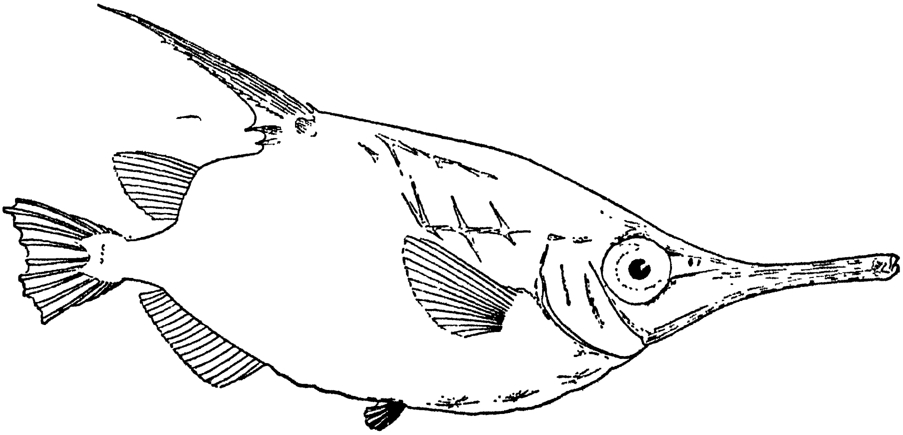

Fig. 3.—? Holotype of *M. robustus* Ogilby, from Queensland; 150 mm. long.

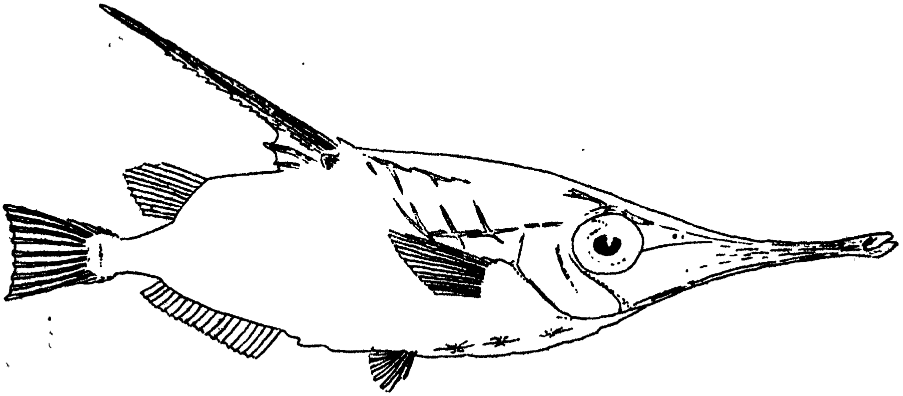

Fig. 4.—A specimen of *M. elevatus* from off Eden, New South Wales, 25-30 fathoms; 95 mm. long.

FAMILY CARANGIDÆ.

A valuable collection of fishes from the Pellew Group in the Gulf of Carpentaria has been made by Surgeon-Lieutenant W. E. J. Paradice, R.A.N., of H.M.A.S. "Geranium." It includes various genera and species of *Carangidæ*, the satisfactory identification of which has necessitated an examination of the typical specimens of several little-known species briefly described about 1882 by the late Sir William Macleay and Mr. C. W. De Vis. Some of these prove to be referable to the synonymy of other older species as detailed in the following pages, while the specific status of a few seems to be valid. They are herein redescribed and figured accordingly. A particularly interesting genus and species, *Ulua mandibularis*, hitherto known only from the typical specimens from Papua, was secured by Dr. Paradice in Australian waters for the first time, and is here redescribed and figured.

The status of various genera and subgenera grouped with the typical *Caranx* can only be determined by a monographic study of the family. They are therefore not considered in the following provisional key, which is merely a means of identifying the species so far known from Australian waters together with a few others from Papua.

Note.—Care is necessary in using this key, as the principal characters, the dentition, and the squamation of the breast are evidently somewhat variable with growth. Further their gradation from one type to another is so complete in the numerous species that some forms are intermediate between two sections, and can be placed almost equally well in either of two divisions.

1. Gill-rakers normal, not projecting forward into mouth. Lips normally rounded.

a^1. Teeth present on jaws and usually on vomer and palatines also.

b^1. A row of larger teeth along the front and sides of each jaw, which are exterior to and markedly different from the smaller depressible inner teeth, when those are present .. .. *Caranx.*

c^1. Breast wholly or partially naked.

d^1. Breast entirely naked before a line between the pectorals and the ventrals.

e^1. Straight portion of lateral line extending forward beyond the vertical of the origin of the second dorsal, and armed with strong scutes .. *bucculentus.*

d^2. Breast partially naked ventrally.

f^1. A patch of scales before the ventral fins surrounded by a naked area; body deeper .. .. *ignobilis.*

f^2. Breast wholly naked on the ventral surface; general form more slender *papuensis.*

c^2. Breast entirely scaly.

g^1. Straight portion of lateral line much shorter than curved portion. A single row of teeth in each jaw.

h^1. Depth equal to or but little greater than length of head .. .. *georgianus.*

h^2. Depth much greater than length of head .. .. .. *platessa.*

g^2. Straight portion of lateral line longer than curved portion: upper jaw with an inner band of villiform teeth.

i^1. Maxillary reaching backward beyond vertical of anterior margin of eye; mandibular teeth in a single row .. .. .. *forsteri.*

i^2. Maxillary not reaching vertical of anterior margin of eye .. .. *valenciennei.*

b^2. No outer row of larger teeth in the jaws, though some fixed conical teeth may be present exterior to the smaller inner depressible ones, if those are present .

j^1. Breast wholly or partially naked.

k^1. Breast entirely or largely naked before a line between the pectoral and ventral fins.

l^1. A band of teeth in each jaw; microscopic teeth on vomer and palatines. .

m^1. Straight portion of lateral line shorter than curved part.

n^1. Depth between origin of first dorsal and ventrals greater than length of soft dorsal.

o^1. Anterior dorsal and anal rays longer than the bases of those fins.

p^1. Dorsal with 22-24 rays; anterior anal ray reaching beyond base of posterior ray .. .. *altissimus.*

p^2. Dorsal with 20-21 rays; anterior anal ray not reaching base of posterior ray.. .. .. *armatus.*

o^2. Anterior dorsal and anal rays shorter than the bases of those fins.

q^1. Eye shorter than postorbital portion of head .. .. *chrysophrys.*

q^2. Eye nearly as long as postorbital portion of head .. .. *malabaricus.*

n^2. Depth between origin of first dorsal and ventrals distinctly less than length of second dorsal .. .. *humerosus.*

m^2. Straight portion of lateral line longer than curved part .. .. *oblongus.*

l^2. Teeth in single rows on sides of jaws, in two rows anteriorly; straight portion of lateral line longer than curved portion .. .. *aurochs.*

k^2. Breast naked ventrally, but scales extend forward on the sides in advance of a line between the pectorals and ventrals.

r^1. Margins of second dorsal and anal fins more or less excised, the anterior rays longer than the others.

s^1. Scutes of lateral line confined to posterior third of its length, the anterior portion feebly arched; about 29 dorsal and 26 anal rays.

1. Anterior dorsal rays very elongate, produced into a falcate lobe; depth at origin of second dorsal less than half the length to middle of caudal peduncle, and equal to or less than length of second dorsal .. .. *ferdau.*

2. Anterior dorsal rays longer than the others but not produced into a falcate lobe; depth at origin of second dorsal equal to half the length to middle of caudal peduncle, and greater than length of second dorsal .. .. *laticaudis.*

s^2. Scutes of lateral line extending along posterior half of its length, the anterior portion distinctly arched; about 21 dorsal and 18 anal rays; broad bands of villiform teeth in the jaws, the outer series somewhat enlarged and widely set .. .. .. *gracilis.*

r^2. Margins of second dorsal and anal fins rounded, all the rays greatly produced .. .. *hullianus.*

j^2. Breast entirely or almost entirely scaly.

t^1. Abdominal profile markedly more deeply convex than the dorsal; eye longer than snout.

u^1. Body greatly compressed; lateral line armed with broad scutes; premaxillary teeth in two series, the outer tubercular, stout, and in a single row, the inner villiform and in a narrow band; mandibular teeth in a single row except anteriorly .. .. *kalla.*

(*C. parasitus* Garman apparently belongs to this section.)

t^2. Abdominal profile equally or less convex than the dorsal; eye shorter than snout.

v^1. Body stout, its depth subequal to the length of the head; teeth minute, curved, not juxtaposed .. .. ***affinis.***

v^2. Body compressed, its depth greater than the length of the head.

w^1. Teeth in a single row, cardiform and juxtaposed; none of the dorsal and anal rays produced. (Palate toothless ?.) .. .. ***malam.***

w^2. Teeth minute, conical, not juxtaposed, in several rows anteriorly in premaxillaries, in single row on sides and on mandible. Many dorsal and anal rays produced into free filaments. Vomer and palatines with teeth .. .. ***radiatus.***

u^2. Teeth of jaws either lacking or infinitesimal .. .. ***Gnathanodon.***

y^1. 19-21 dorsal and 16-17 anal rays. Palate toothless.

z^1. Depth at origin of second dorsal subequal to length of base of that fin .. .. ***speciosus speciosus.***

z^2. Depth at origin of second dorsal greater than the length of the base of that fin .. .. ***speciosus obtusiceps.***

y^2. 26-27 dorsal and 23 anal rays: palate with microscopic teeth; a dark blotch on shoulder .. .. ***leptolepis.***

2. Gill-rakers very long and numerous, projecting forward into the mouth on each side of the tongue. Lips sharp-edged. Breast entirely naked before a line between the pectoral and ventral fins. A patch of microscopic teeth on the vomer, and a very narrow band on each palatine. Body greatly compressed, its profiles angular .. ***Ulua.***

1^a. Depth at origin of second dorsal almost equal to half the length to the hypural joint; dorsal and anal rays produced .. .. .. ***mandibularis.***

CARANX PAPUENSIS Alleyne & Macleay.

(Plate XIII.)

Caranx papuensis Alleyne & Macleay, Proc. Linn. Soc. N.S. Wales i. 4, 1877, p. 325, pl. x., fig. 3.

D. viii., i/22; A. ii., i/18; P. 21; V. i/5; C. 17.

Length to the end of the middle caudal rays, 136 mm. Depth at the origin of the second dorsal fin (49 mm.), 2·5 in the length to the hypural joint (124); head (37) 3·3 in the same. Eye (10) as long as the snout, and 3·7 in the head; interorbital space subequal to the width of the eye. Pectoral fin (47) 0·2 longer than the head.

Body greatly compressed and elevated. The upper profile from the snout to the caudal peduncle forms an even and very convex curve, which is much more arched than the lower profile. Hinder angle of the maxillary almost reaching the vertical of the middle of the eye; it is broad and obliquely truncate posteriorly, with a broad supplemental bone. Adipose eyelid broad posteriorly but not covering the pupil. Preopercular edge membranaceous, smooth and broadly rounded. Cheek, upper portion of operculum, and temporal region covered with small scales; the snout, interorbital space and a median area extending back to the origin of the first dorsal are naked.

Premaxillaries with an outer row of strong conical teeth which are largest anteriorly and become smaller backward; an inner band of villiform teeth on each side. Mandibular teeth in a single row, and much smaller than those of the outer series of the premaxillaries. A small patch of teeth on the vomer and a band of minute ones on each palatine; the roof of the mouth and the tongue also bear many patches of microscopic teeth. Eighteen slender gill-rakers on the first gill-arch, of which those at the posterior angle are half as long as the eye.

Body covered with scales of moderate size which extend forward on the sides to the isthmus, but leave the ventral surface of the breast naked; this naked area is sharply defined on each side, and is broadest just before the ventral fins, becoming narrower anteriorly. A few scales implanted in advance of the ventral fins suggest that this area has been denuded, though no scale-pits can be traced on the naked area. A low scaly sheath covering the bases of the dorsal and anal fins. Lateral line strongly arched anteriorly, becoming straight below the eighth dorsal ray and well before the middle of its length; the whole of the straight portion is armed with scutes, which increase in size backward to the caudal peduncle, where they cover about two-thirds of its width.

Dorsal spines slender, imperfect in the type, the third a little shorter than the postorbital portion of the head. Anterior dorsal rays imperfect, but elevated into a high lobe. Anal produced into a falcate lobe anteriorly and preceded by two strong spines. Pectoral falcate, reaching beyond the angle of the lateral line. Ventrals inserted below the pectorals. Caudal deeply forked.

Colouration.—Silvery, darker on the back.

Described and figured from the holotype in the Macleay Museum. It differs from Macleay's description in having the breast naked instead of scaly but as noted above this may have been denuded. A second specimen in the Australian Museum from the Solomon Islands has the breast similarly naked but, apart from this character, both are quite similar to *C. forsteri* with which *C. papuensis* may prove to be identical.

Macleay recorded that he had two specimens, the largest 6 inches long. This last is the specimen here described and figured. The other is also preserved in the Macleay Museum, and is only a couple of inches long; it is apparently referable to *C. forsteri.*

Locality.—Hall Sound, Papua.

CARANX MELAMPYGUS (Cuv. & Val. ?) Gunther.

(Plate XI.; Fig. 2.)

Caranx melampygus Cuvier & Valenciennes, Hist. Nat. Poiss. ix., 1833, p. 116.

Caranx stellatus Edoux & Souleyet, Voy. Bonite, Poiss., 1841, p. 167, pl. iii., fig. 2. *Id.* Jordan & Jordan, Mem. Carnegie Mus. x. 1, 1922, p. 40.

Caranx melampygus Gunther, Fishe Sudsee v., 1876, p. 133, pl. lxxxvi. *Id.* Macleay, Proc. Linn. Soc. N. S. Wales vii., 1882, p. 355.

Carangus melampygus Jordan & Evermann, Bull. U.S. Fish. Comm. xxiii. i., 1905, p. 192, fig. 73.

? *Caranx moresbiensis* Macleay, Proc. Linn. Soc. N. S. Wales vii., 1882, p. 358.

D. viii., i/23 ; A. ii., i/19 ; P. 20 ; V. i/5 ; C. 17.

Length to end of middle caudal rays 203 mm. Depth at the origin of the second dorsal (71 mm.) 2·6 in the length to the hypural joint (188); head (57) 3·2 in the same. Eye (12) 1·6 in the snout (20); interorbital space (15) 3·8 in the head. First dorsal ray (41) 1·3 in the head. Pectoral fin (68) 0·1 longer than the head.

Body much compressed; upper profile from the snout to the origin of the first dorsal strongly arched and keeled and much more convex than the lower, which forms an oblique line from the isthmus to the origin of the anal. Hinder angle of the maxillary reaching the vertical of the anterior third of the eye; it is obliquely truncate posteriorly with a broad supplementary bone. Adipose eyelid broad posteriorly but not covering the pupil. Preopercular edge membranous, finely crenulate, its hinder margin subvertical and the angle broadly rounded. Cheek, upper portion of operculum and temporal region with small scales; the snout, interorbital space and a median area extending backward to the origin of the first dorsal naked.

Premaxillaries with a row of strong conical teeth and a narrow band of small villiform ones. Mandible with a row of strong teeth on each side which are smaller than those of the premaxillaries; no inner band of smaller teeth. A small triangular patch of minute teeth on the vomer and a broad band on each palatine: a band extends along the median line of the tongue. Eighteen gill-rakers on the lower limb of the first gill-arch; those at the posterior angle more than half as long as the eye.

Body covered with scales of moderate size which almost completely cover the breast, leaving only a tiny patch near the isthmus bare. Bases of the pectoral fins naked; the dorsal and anal fins have scaly sheaths covering the basal portions of their anterior rays. Lateral line strongly arched to below the anterior dorsal rays, the arched part being 1·4 in the length of the posterior straight portion: almost all of the posterior part is armed with scutes which increase in size backward to the caudal peduncle, where they are equal to about two-thirds of its width. An oblique keel on each side of the base of the tail.

Dorsal spines slender, the third highest and but little shorter than the length of the postorbital portion of the head. Anterior dorsal rays produced into a falciform lobe. Anal similar to the dorsal. Ventrals inserted slightly behind the vertical of the bases of the pectorals. Pectorals falcate, reaching well beyond the angle of the lateral line. Caudal deeply forked.

Colouration.—Silvery after long preservation in alcohol, the upper half darker.

Described and figured from a specimen in the Macleay Museum collection. It is labelled as *C. moresbyensis* Macleay (Proc. Linn. Soc. N. S. Wales vii., 1882, p. 358), and being the only specimen in the collection bearing that name, was supposed to be the holotype of the species. According to Macleay's meagre description, however, the type was only two inches long, so although this specimen agrees in a general way with *C. moresbyensis* as characterised, it affords no reliable evidence to determine the true status of that species.

Locality.—Port Moresby, Papua.

CARANX LEPTOLEPIS Cuvier & Valenciennes.

(Text-fig. 5-6.)

Caranx leptolepis Cuvier & Valenciennes, Hist. Nat. Poiss. ix., 1833, p. 63. *Id.* Gunther, Brit. Mus. Cat. Fish. ii., 1860, p. 440. *Id.* Day, Fish. India, 1878, p. 225, pl. li., fig. 4. *Id.* McCulloch, Biol. Res. "Endeavour" iii. 3, 1915, p. 129, pl. xxi.

Caranx cheverti Macleay, Proc. Linn. Soc. N. S. Wales i., 1877, p. 324, pl. x., fig. 1.

Caranx procaranx De Vis, Proc. Linn. Soc. N. S. Wales ix., 1884, p. 540.

Synonymy.—As already shown,[1] *Caranx cheverti* Macleay is synonymous with *C. leptolepis.* The holotype, here illustrated (Fig. 5), has been borrowed from the Macleay Museum for the purpose. It is 138 mm. long to the end of the middle caudal rays and exhibits the following characters:—

D. viii., i/25; A. ii., i/22; V. i/5; P. 18; C. 17.

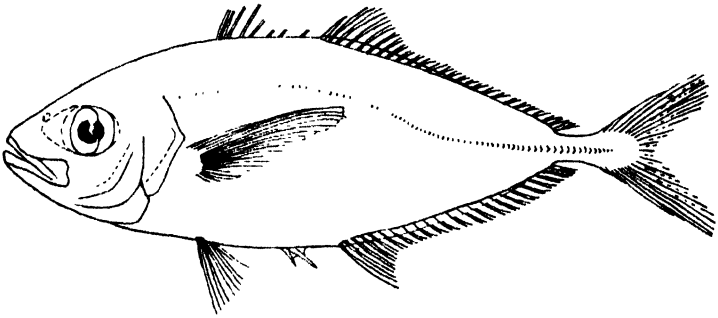

Fig. 5.—*Caranx leptolepis.* Holotype of *C. cheverti* Alleyne & Macleay, from Katow, New Guinea.

Depth at origin of second dorsal (43 mm.) 2·9 in the length to the hypural joint (127); head (37) 3·4 in the same. Eye (11) as long as its distance from the end of the snout, 3·3 in the head.

Body entirely covered with small scales which extend over the breast. Straight portion of the lateral line a little shorter than the curved part, armed with about 23 scutes which merge into the scales anteriorly; broadest scutes are scarcely one-third of the width of the caudal peduncle. Jaws practically toothless; a very few microscopic teeth are present near the mandibular symphysis, and two occur at widely spaced intervals on one side of the lower jaw; premaxillaries, vomer and palatines toothless. A broad adipose eyelid posteriorly and a narrow anterior one. The sides are silvery and the back dark, the junction of the two sharply defined. A large round spot below the commencement of the lateral line and extending over the end of the operculum.

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[1] McCulloch, Biol. Res. "Endeavour" iii. 3, 1915, p. 130.

I am indebted to Mr. H. A. Longman, Director of the Queensland Museum, for the loan of the holotype of *Caranx procaranx* De Vis (Fig. 6). This specimen is 80·5 mm. long to the hypural joint, and is in a somewhat dilapidated condition, but having compared it with specimens of *C. leptolepis* I find it agrees in all details. It has the following characters:—D. vii. (?), i/26; A. ii, ?/23; V. i/5; P. 20; C. 17.

Depth at origin of second dorsal (28 mm.) 2·8 in the length to the hypural joint (80·5); head (23·5) 3·4 in the same. Eye (7·5) 0·1 longer than the snout (6·5), and 3·1 in the head.

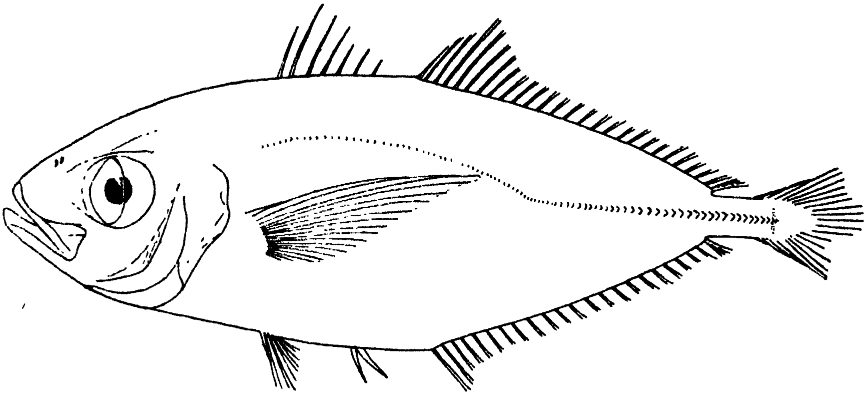

Fig. 6.—*Caranx leptolepis.* Holotype of *C. procaranx* De Vis, from Cape York, Queensland.

The body has been entirely covered with small scales, which extended over the breast. Straight portion of the lateral line a little shorter than the curved part, and armed with about 25 narrow scutes which merge into the scales anteriorly; the broadest scutes are less than one-third as wide as the caudal peduncle. A few microscopic teeth are present near the symphysis of the premaxillaries; the rest of the jaws, vomer and palatines are toothless. A broad adipose eyelid posteriorly, and a narrower one anteriorly. The sides are largely silvery with a dark area on the back sharply defined; a dark blotch on the end of the operculum apparently extends onto the shoulder.

This specimen differs from De Vis' description in several important details, but there can be no doubt that it is his actual holotype, and that the discrepancies are due to the usual inaccuracies common to his descriptions. He described the lateral line as "armed throughout, but the plates of the curved portion are smaller than those of the straight." The specimen shows that the scales of the lateral line are adherent, whereas they have been lost from both sides of it, and the so-called armature of the greater portion consists merely of ordinary scales. The larger scales which he described as irregularly scattered among the smaller ones are merely a few which have remained adherent, and appear conspicuous and large among the scale-pits which cover the greater portion of the body.

Localities.—*Caranx leptolepis* is, so far, known in Australia only from Queensland waters. The holotype of *C. cheverti* was collected at Katow, New Guinea, while that of *C. procaranx* was taken at Cape York.

CARANX LATICAUDIS Alleyne & Macleay.

(Plate XII.)

Caranx laticaudis Alleyne & Macleay, Proc. Linn. Soc. N. S. Wales i., 1877, p. 325, pl. x., fig. 2.

D. viii., 1/29; A. i., 1/26; P. 1/22; V. i/5; C. 17.

Length to the end of the middle caudal rays, 262 mm. Depth at the origin of the second dorsal (116 mm.) 2·06 in the length to the hypural joint (240); head (68) 3·5 in the same. Eye (15) 1·3 in the snout (20); interorbital space (23) 2·9 in the head. Pectoral fin (92) 0·3 longer than the head.

Body much compressed; the upper profile from the snout to the origin of the second dorsal is sharply keeled and is more strongly arched than the lower, which forms an oblique line from the chin to the origin of the anal. Hinder angle of the maxillary just reaching the vertical of the anterior border of the eye; it is obliquely truncate posteriorly, with a large supplemental bone above it. Adipose eyelid forming a narrow rim which encircles the eye. Preopercular edge finely crenulate, its hinder margin vertical and the angle broadly rounded. Cheek, operculum and temporal regions largely covered with small scales; the snout, interorbital space, and a narrow median area extending backward to the origin of the first dorsal are naked.

Premaxillaries with a band of small teeth on each side, which is broadest anteriorly and becomes narrower as it extends backward; a few of the outer teeth are a little larger than the others, conical, and fixed, but there are no caniniform teeth. Mandible with a narrow band of small teeth on each side, the outer ones larger than the others. A broad patch of minute teeth on the vomer, a narrow band on each palatine, and others on the tongue. Eighteen gill-rakers on the first gill-arch, those at the angle about half as long as the eye.

Body covered with very small scales, but the breast in advance of the ventral fins is naked; this naked area is restricted to the ventral surface posteriorly, but it becomes broader and extends a little way up the sides anteriorly. The bases of the pectoral fins are naked; the dorsal and anal fins have broad scaly sheaths covering the basal portions of their rays. Lateral line feebly arched anteriorly, becoming straight at the tips of the pectoral fins, and behind the middle of its length. About one-fourth of the lateral line is armed with scutes, which are well developed on the caudal peduncle, but become rapidly smaller and merge into the other scales well behind the point where the straight portion commences to arch forward.

Dorsal spines weak, the fourth highest and about as long as the eye;

the eighth spine is much stouter than the others, and stands isolated between the two dorsal fins. Anterior dorsal rays damaged but apparently shorter than the postorbital portion of the head; they form a short angular projection but not a falciform lobe. Anal produced into a falcate lobe anteriorly, the first ray much longer than the postorbital portion of the head; a single weak and isolated spine precedes the anal fin. Pectoral falcate. Ventrals inserted well behind the pectorals, but a little before the vertical of the first dorsal spine; the spine is slender and much shorter than the first ray. Caudal broadly forked.

Colouration silvery after long preservation in alcohol, the back darker.

Described and figured from the unique holotype in the Macleay Museum. It differs from Macleay's brief description in having 29 instead of 26 dorsal rays, but its authenticity is beyond doubt.

This species is very close to *C. ferdau* Forskal, but the only specimen known differs from the figures and descriptions of that species in having a deeper body, and in lacking the anterior falcate lobe of the second dorsal. It resembles *ferdau* in its dentition, squamation, form of the lateral line, large number of dorsal and anal rays, and weak anal spines, and clearly belongs to the same subdivision of *Caranx* as that species.

Locality.—Hall Sound, near Yule Island, Papua: collected by Sir William Macleay during his expedition to New Guinea in 1875 in the "Chevert."

ULUA MANDIBULARIS Macleay.

(Plate XIV.)

Caranx mandibularis Macleay, Proc. Linn. Soc. N. S. Wales viii., 1883, p. 356.

Ulua mandibularis McCulloch, Biol. Res. "Endeavour" iii. 3, 1915, p. 140.

D. vii., 1/20; A. ii., 1/17; V. i/5; P. 20; C. 17. About 20 scutes on the lateral line.

Length to the end of the middle caudal rays 256 mm. Depth at the origin of the second dorsal (114 mm.) 2·1 in the length to the hypural joint (241); head, excluding the mandible (70), 3·4 in the same. Eye (20) as long as the snout, and 3·5 in the head; interorbital width (18) but little less than the length of the eye. Pectoral fin (103) 0·4, and first dorsal ray (95) 0·3 longer than the head; first anal ray (63) 1·1 in the head.

Body greatly compressed; the upper profile from the snout to the origin of the second dorsal sharply keeled and markedly convex on the nape and slightly concave on the snout; it is more arched than the lower profile. Mandible broad and compressed, the chin projecting, forming an obtuse angle in advance of the upper jaw. Hinder angle of the maxillary reaching the vertical of the anterior margin of the pupil; it is obliquely truncate posteriorly, with a moderately broad supplemental bone. Adipose eyelid forming a narrow rim which encircles the eye. Preopercular border entire and broadly rounded. Part of the cheek, the upper part of the operculum and a small area on the temporal region are scaly; the remainder of the head and a narrow median area extending backward to the first dorsal spine are naked.

A single row of microscopic teeth in the upper and lower jaws, and a patch on the vomer; palatines apparently toothless. Lips sharp edged. Gill-rakers very long, projecting forward in the mouth, almost to the level of the vomer; there are fifty on the lower limb of the first gill-arch, and those at the hinder angle are about three-fourths as long as the eye.

Body covered with small scales, but the whole breast in advance of an oblique line from behind the ventral rays to the lower base of the pectoral is naked; the bases of the pectoral fins are also naked. Dorsal and anal fins with broad scaly sheaths covering the anterior three-fourths of their lengths. Lateral line strongly arched anteriorly, becoming straight below the ninth dorsal ray and a trifle in advance of the middle of its length. There are about 20 scutes which are strong on the caudal peduncle but decrease rapidly in size forward and merge into the scales anteriorly on the straight portion Two oblique ridges on each side of the base of the tail.

Dorsal spines weak, the third highest and scarcely longer than the eye; sixth spine minute, the seventh stronger and isolated in advance of the second dorsal. Anterior ray greatly produced, the four following successively shorter; the remainder subequal in length. Anal similar to the dorsal but with the anterior rays shorter. Pectoral strongly falcate, reaching backward beyond the middle of the dorsal and anal fins. Ventral small, with very weak spines, reaching backward half their distance from the anal. Caudal deeply forked.

Colouration.—Olive-green above, silver below, the junction of the two colours sharply defined above the middle line of the body. The edges of the caudal and anal blackish, the inner axil of the pectoral black.

Described and figured from a specimen, 256 mm. long, from the premaxillary symphysis to the end of the middle caudal rays.

Macleay has described the head as free of scales, but there are really numerous small scales on the cheeks and upper parts of the opercles.

Affinities.—The two typical specimens of this species are preserved in the Macleay Museum, and a co-type is in the Australian Museum. They are very similar to the figure of *U. richardsonii*[2] but have the frontal profile a little more convex, the eye larger, and a few more anal rays.

Locality.—Sir. Edward Pellew Islands Group, Gulf of Carpentaria; coll. Dr. W. E. J. Paradice, R.A.N., June, 1923. This genus and species has not been hitherto recognised from Australian waters, the types from near Port Moresby being the only specimens previously recorded.

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[2] Jordan and Snyder.—Mem. Carnegie Mus. iv., pt. 2, 1908, p. 39, pl. liii.

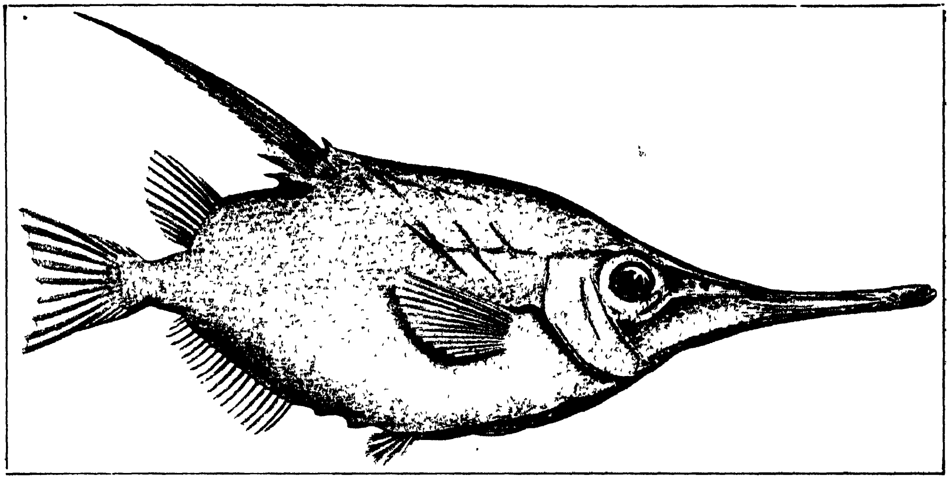


Fig. 1.—Lectotype of *Macrorhamphosus elevatus*, from Newcastle Bight. 140 mm. long.

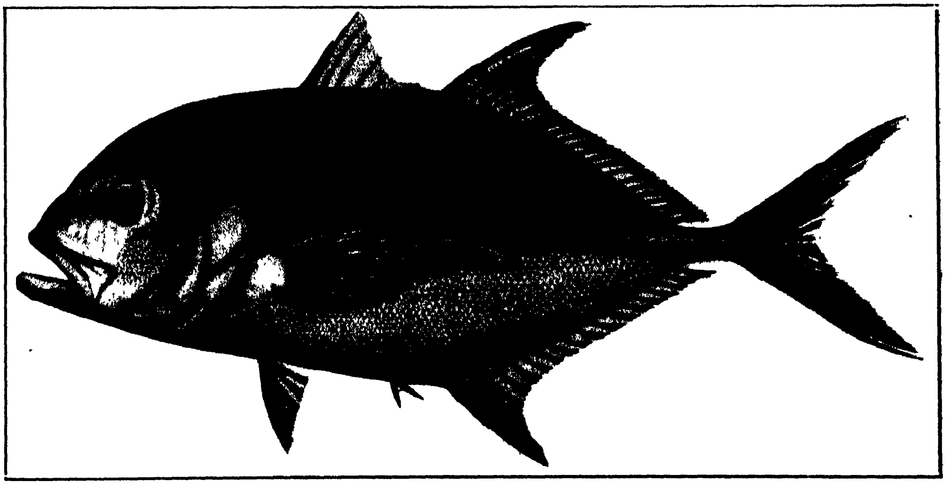
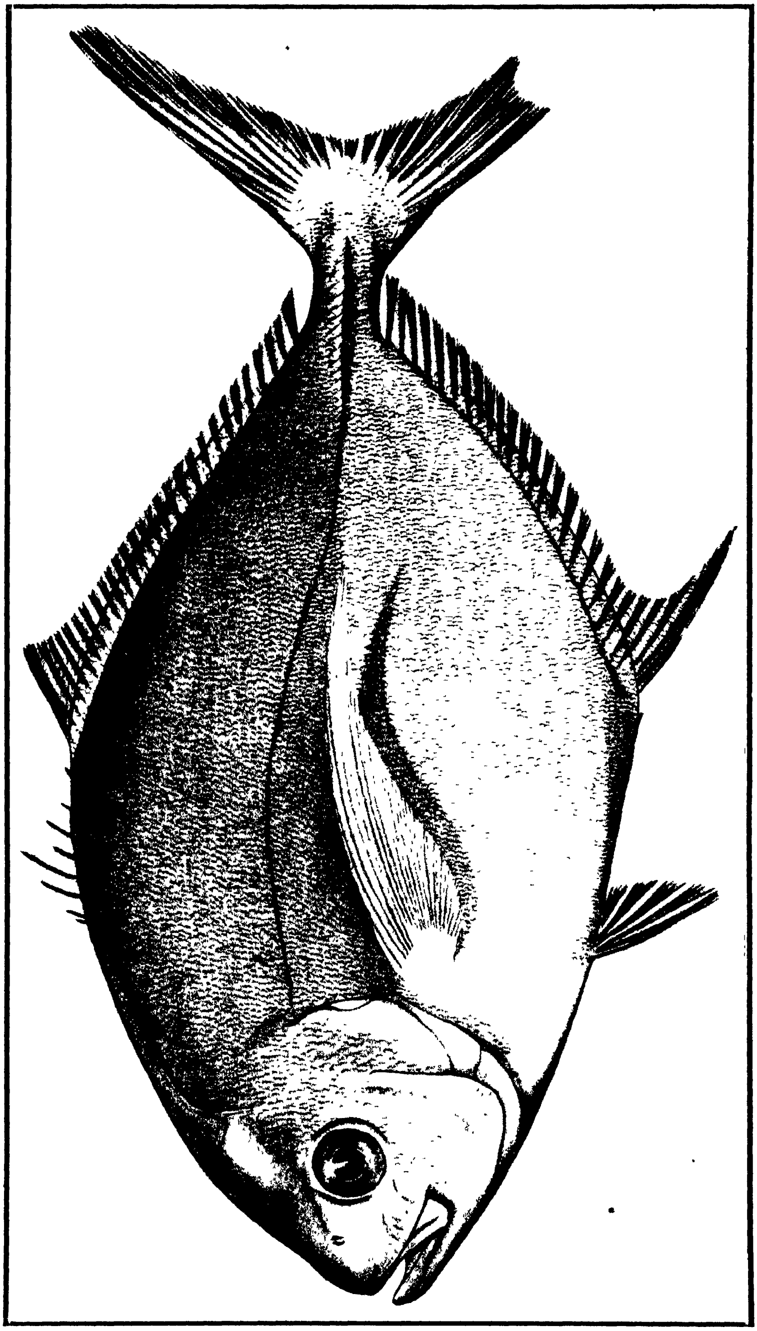


Fig. 2.—*Caranx melampygus* Cuvier & Valenciennes.
A specimen, 203 mm. long to the end of the middle caudal rays, from Port Moresby, Papua.

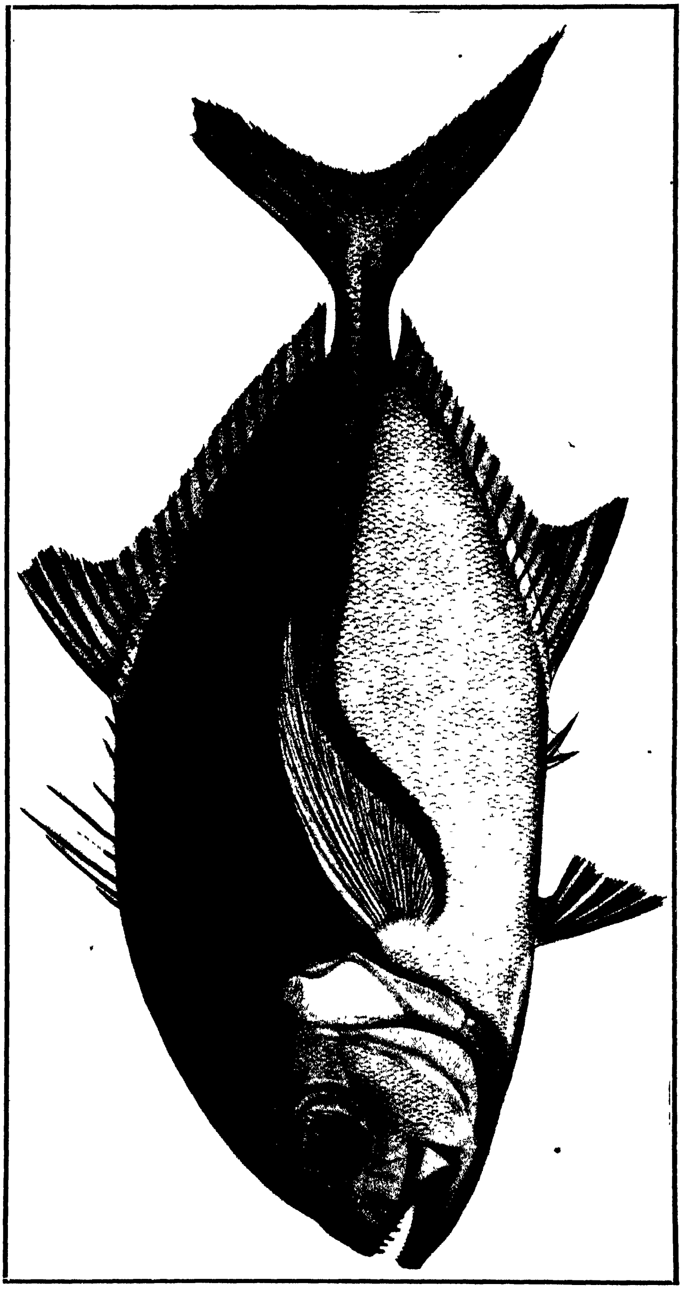
A. R. McCulloch, del.



Caranx laticaudis Alleyne & Macleay.

Holotype, 262 mm. long to the end of the middle caudal rays, from Hall Sound, Papua.

A. R. McCulloch, del.

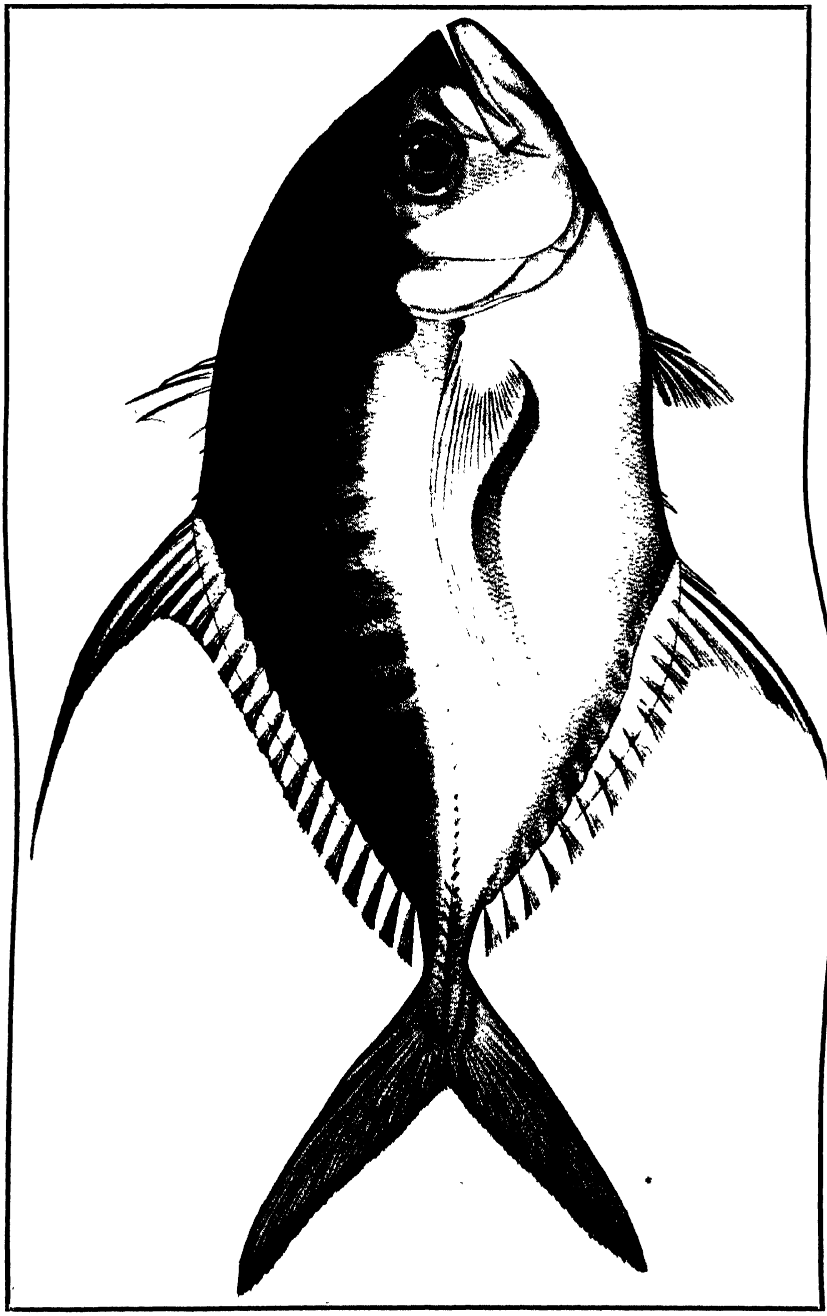


Caranx papuensis Alleyne & Macleay.

Holotype, 136 mm. long to the end of the middle caudal rays, from Hall Sound, Papua.

A. R. McCulloch, del.

Face page 76.



ULUA MANDIBULARIS Macleay.

A specimen 256 mm. long to the end of the middle caudal rays, from Sir Edward Pellew Islands Group, Gulf of Carpentaria.

A. R. McCulloch, del.

ON FOSSIL PLANTS FROM BELLEVUE, NEAR ESK.

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(Plates XV.-XXI.; Text figures 1-3.)

WELL-PRESERVED specimens of fossil plants from Bellevue Station, a few miles easterly from Esk, on the Upper Brisbane River, were recently brought under the notice of the Queensland Museum by His Excellency the Governor of Queensland, Sir Matthew Nathan. The specimens were from among a collection made by Mrs. Lumley Hill, to whose enthusiasm in increasing this material the Museum owes a splendid series of fossil plants from this locality. From the variety of species represented and their apparent abundance, it seems certain that, with further systematic collecting, the horizon would rival that of Denmark Hill, Ipswich, as possibly the best-known locality for fossil plants in Queensland.

The collection itself is of more than ordinary interest, containing as it does a number of forms which have not previously been recorded from Mesozoic rocks in Queensland.

Since the last descriptions of fossil plants from the Esk district were published (Q'land Geol Survey, Publications 252, 257, 259) two papers have appeared which deal more or less directly with the flora.

J. H. Reid, in a note on the Walloon Jurassic Flora (Proc. Roy. Soc. Qld., xxxiv., 1922 [1923], 168-170), would appear to record changes in the range and distribution of *Thinnfeldia* and *Tæniopteris*. The paper, however, seems merely to anticipate the correlation of the Esk Series with the Ipswich Series instead of with the Walloon Series, and to call attention to the modifications in the range of the species of these genera necessitated by this change. No new facts appear to be presented, and the distribution of these genera, as regards the Series in which they have been found, remains unaltered.

J. H. Reid and C. C. Morton (Geology of Country between Esk and Ipswich, Qland. Govt. Mining Journ., Jan. 1923, 7-14) propose the correlation of the Esk Series (comprising the Esk shales and Bellevue conglomerates) with the Ipswich Series, and also recognise the presence of an underlying series, the Borallon Series, outcropping between the Esk Series and the Brisbane Schist Series. The Esk and Ipswich Series are placed as Upper Triassic and the Borallon as Lower (?) Triassic. Provisional lists of the fossil plants are given, but as they are only, for the most part, generic determinations, they are of no value for detailed correlation. The evidence for placing the Borallon Series so low in the Triassic appears to be the fact that there is " a well-marked unconformity," revealed by the strikes and dips, between the Borallon and Esk Series; at the same time it is stated that the fossils so far found by these authors are " also common to both the Ipswich and Esk Series."

The collection here described from the neighbourhood of Bellevue contains the following species:—*Neocalamites hoerensis*, *Schizoneura* cf. *africana*, *Schizoneura* sp. *a*, *Cladophlebis australis*, *C. lobifolia*, *Thinnfeldia Feistmanteli*, *T. lancifolia*, *Dictyophyllum rugosum*, *Pecopteris* (*? Asterotheca*) *Hillæ*, n. sp., *Tæniopteris* (*? Danæopsis*) *crassinervis*, *T. Carruthersi*, *T. Tenison-Woodsi*, *Sphenopteris superba*, *S. pecten*, *? Nilssonia superba*, n. sp., *Pterophyllum Nathani*, n. sp., *Pseudoctenis eathiensis*, *Podozamites lanceolatus*, *Ginkgoites digitata*, *G. sibirica*, *Ginkgoites* sp., *Baiera bidens*, *B. Simmondsi*, Gymnospermous seeds, *Phœnicopsis elongatus*.

The species which had previously been described from the Esk district are:—*Schizoneura* sp. *a*, *Cladophlebis australis*, *Dictyophyllum Davidi*, *Hausmannia Buchii*, *Thinnfeldia Feistmanteli*, *T. odontopteroides*, *T. lancifolia*, *Tæniopteris Tenison-Woodsi*, *T. Carruthersi*, *T. crassinervis*, *Stenopteris elongata*, *Ginkgo* cf. *magnifolia*, *Baiera Simmondsi*, *Pterophyllum abnorme*, *T. contiguum*, *T. Nathorsti*, *Pseudoctenis eathiensis*, *Otozamites Queenslandi*, *Taxites planus*, *Phœnicopsis elongatus*.

Of this latter list of twenty species, ten had also been found in the Ipswich Series, but eight of the others were confined to the Esk Beds and this, combined with the fact that very little field work had been done in the area, made it difficult to correlate the Esk beds with the Ipswich or Walloon Series with any degree of certainty. They were correlated with the Walloon Series mainly on the presence of coniferous types which were not known from the Ipswich Series.

As a result of further field work since 1918, by officers of the Queensland Geological Survey, the Esk Series have been correlated on stratigraphical grounds with the Ipswich Series. The evidence presented by the increased number of species of fossil plants confirms this proposed correlation. The additions to the fossil flora of the Esk district described here comprise *Neocalamites hoerensis*, *Schizoneura* cf. *africana*, *Cladophlebis lobifolia*, *Dictyophyllum rugosum*, *Pecopteris* (*? Asterotheca*) *Hillæ*, n. sp., *Sphenopteris superba*, *S. pecten*, (*? Nilssonia*) *superba*, n. sp., *Pterophyllum Nathani*, n. sp., *? Podozamites lanceolatus*, *Ginkgoites digitata*, *G. sibirica*, *Ginkgoites* sp., *Baiera bidens*, Gymnospermous seeds.

Of the thirteen determinable species in this list, three (*Pecopteris Hillæ*, *? Nilssonia superba*, and *Pterophyllum Nathani*) are new, three others (*Cladophlebis lobifolia*, *Sphenopteris pecten*, and *Ginkgoites sibirica*) are new to the Queensland fossil flora, and six others had previously only been described from the Ipswich Series.

Of the thirty-three determinable species now known from the Esk district, sixteen occur in the Ipswich Series.

Such species as *Pecopteris* (*? Asterotheca*) *Hillæ* and *Tæniopteris* (*? Danæopsis*) *crassinervis* point to a Rhætic age for the Esk Series, thus confirming the correlation of this Series with the Ipswich Series, for which a Rhætic age is indicated both by the fossil plants and insects.

It is not proposed to put forward here a critical analysis of the flora of the Esk Series, in view of the fact that the collections are still being added to (thanks to the enthusiasm of Mrs. Lumley Hill); also I have in hand for examination a series collected by Messrs. Reid and Morton in the district. Amongst these collections there are so far very few specimens from the Series which Reid and Morton have called the Borallon Series, and it is hoped that, before the whole flora is analysed, further specimens may be available for comparison with Lower Triassic floras.

EQUISETALES.

NEOCALAMITES HOERENSIS (Schimper).

(Plate XV., fig. 1.)

(*See* Q'land Geol. Surv., Pub. 252, 1915, p. 33, pl. 2, fig. 1.)

Specimen *F. 1485* is a good example of this species, which has previously been described from Denmark Hill, Ipswich (Walkom, 1915, p. 33).

The stem impression is 1·5 cm. wide, the nodes being about 3 cm. apart; in portion of the specimen the stem is coarsely ridged longitudinally, the ridges being about 1·5 mm. apart. The leaves are long and narrow (12 cm. long by 1·5-2 mm. wide) and are not very numerous.

One of the chief points of difference between this species and *N. Carrerei* is that in the latter the number of leaves in a whorl is considerably greater.

Locality.—Portion 32, Parish of Northbrook. (*F. 1485.*)

SCHIZONEURA cf. **AFRICANA** Feistm.

(Text-fig. 1.)

(*See* Q'land Geol. Surv., Pub. 252, 1915, p. 35, Pl. 3, fig. 1.)

In 1915 I referred a specimen from the Ipswich Series at Ebbw Vale to this species. In the present collection there are specimens which confirm my previous determination.

The stem is about 1·5 cm. in diameter, jointed, with the leaves in whorls at the nodes. There are about 5 leaves in a whorl, each nearly 1 cm. wide and more than 7 cm. long, traversed by 3-5 parallel veins. The leaf becomes split along these veins, and gives the appearance of several very long thin leaves. The leaves are preserved along the bedding planes of the rock, the stem being perpendicular to the bedding.

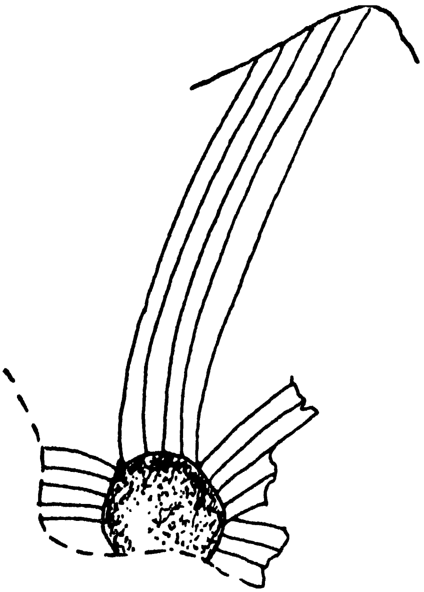


Fig. 1.—*Schizoneura* cf. *africana* Feistmantel.

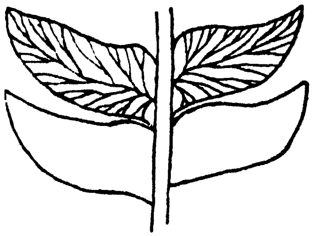


Fig. 2.—*Cladophlebis lobifolia* (Phillips). (× 2)

The specimens show very close similarity to that figured by Seward (1908, p. 89) from the Beaufort Series of South Africa, assigned to a Permian horizon.

Locality.—Portion 74, Parish Wivenhoe. (*F. 1539.*)

SCHIZONEURA sp. *a* Seward.

(Plate XVI.)

(*See* Q'land Geol. Surv., Pub. 252, 1915, p. 36.)

Pith casts of Equisetaceous stems appear to be abundant on the horizon from which these fossils were obtained. They are of a type similar to those described as *Schizoneura* sp. *a* from South Africa (Seward, 1908, p. 86) and Queensland (Walkom, 1915, p. 36).

The stems are in some cases more than ·75 m. (2 ft. 6 in.) long, 5 cm. wide; with internodes 8-9 cm. long. They are finely ridged, with about 17 ridges per cm. of breadth.

One specimen (*F. 1487a*) shows the basal end of a branch about 5 cm. in diameter.

Associated with some of these stems are what appear to be broad linear leaves, up to 2·5 cm. wide, traversed by few (up to 6) parallel veins, between which are fine parallel striations. Some of these leaves are so distributed that they appear to have their origin at the nodes of the stems, and should further specimens show this to be the case the reference of the pith casts to the genus *Schizoneura* will receive confirmation.

Localities.—Portions 74 (*F. 1533*—Plate XVI.) and 42, Parish of Wivenhoe (*F. 1554*).

FILICALES. OSMUNDACEÆ (?)

CLADOPHLEBIS AUSTRALIS (Morris).

(Plate XVII., fig. 1, E.)

(*See* Q'land Geol. Surv., Pub. 257, 1917, p. 3.)

Large fronds of this very common Mesozoic species are present in the collection. They do not differ from typical examples previously described and figured from the Ipswich and Walloon Series.

Locality.—Portion 32, Parish of Northbrook (*F. 1542*).

CLADOPHLEBIS LOBIFOLIA (Phillips).

(Plate XV., Fig. 2; Text-fig. 2.)

(For full synonymy *see* Seward, 1900, p. 145.)

Specimens from Bellevue differ from any species of *Cladophlebis* previously described from Queensland and correspond closely with figured examples of *C. lobifolia* from other parts of the world.

The frond is bipinnate, the pinnæ being long, linear, narrow, opposite or alternate; the pinnules are short, closely set, obtusely pointed, subopposite, generally with a lobe on the upper margin near the base. The venation is alethopteroid.

Localities.—Portion 24, Parish of Esk (*F. 1544*); Portion 42, Parish of Wivenhoe (*F. 1473*).

THINNFELDIEÆ.

THINNFELDIA FEISTMANTELI Johnston.

(Plate XVII., fig. 1, F.)

Good examples of this common species are in the collections from Bellevue. The species has been recorded in Queensland from the Ipswich Series in the Ipswich district, and from Kilcoy Range and 5 miles north of Esk. It has a wide distribution outside Queensland in rocks of Lower Mesozoic age.

For full reference to the synonymy and a discussion of the species *see* Queensland Geological Survey Publication 257, p. 17.

A small fragment on specimen *F. 1472* shows the structure of the rachis previously noted (Walkom, 1917, p. 19).

Locality.—Portion 42, Parish Wivenhoe (*F. 1468*).

THINNFELDIA LANCIFOLIA (Morris).

(Plate XV., fig. 3.)

(*See* Q'land Geol. Surv., Pub. 257, 1917, p. 21, Pl. 3, 4, 7.)

Specimens belonging to this species from the Esk district are in general of a somewhat more robust type than those previously described from Queensland. They do not, however, differ from typical examples of the species.

One specimen (*F. 1583*) shows a certain amount of the cell structure (probably of the cuticle) preserved as a silicified film. Similar specimens to this have been under examination for some time past from the Queensland Geological Survey collections from the Ipswich Series at Denmark Hill.

Locality.—Portion 42, Parish Wivenhoe (*F. 1472*); Portion 24, Parish Esk (*F. 1546*).

DIPTERIDINÆ.

DICTYOPHYLLUM RUGOSUM L. & H.

(Plate XXI., fig. 1.)

(*See* Q'land Geol. Surv., Pub. 257, 1917, p. 9, Pl. 4, 6, 9.)

Specimen *F. 1468* shows portion of a frond with five pinnæ, and is the most complete example of a frond of this species yet recorded from Queensland. The pinnæ are 10 cm. or more in length and up to 2·5 cm. wide; they are deeply divided into segments in their distal portions.

Locality.—Portion 42, Parish Wivenhoe (*F. 1468*).

(?) MARATTIALES.

PECOPTERIS (? ASTEROTHECA) HILLÆ, n. sp.

(Plate XVII., figs. 1, 2, and 3.)

Frond bi- (? tri-) pinnate; ultimate pinnæ long, narrow, parallel-sided; pinnules not quite at right angles to rachis, to which they are attached by the whole base, margins parallel, apices bluntly rounded, base slightly expanded. Midrib distinct; secondary veins few, simple, almost at right angles to midrib.

Fertile pinnæ (Plate XVII., fig. 3; *B* enlarged) differ in shape from sterile (Plate XVII., fig. 2; *A* enlarged) only in the pinnules being somewhat narrower and more pointed.

Sori (or synangia) contiguous, ·5 to ·75 mm. in diameter, in a row parallel to the margin of the pinnule, and composed usually of 4 sporangia. Further details of structure of sori and sporangia not determinable.

Ultimate pinnæ are up to 4 cm. long and 6-10 mm. broad.

The pinnules are 1·5 to 2 mm. broad and up to 4·5 mm. long, and have from 5 to 7 simple veins from each side of the midrib. In the sterile specimens none of these secondary veins branch as described by Zeiller (1903, p. 26) in *P.* (*Asterotheca*) *Cottoni* from the Rhætic of Tonkin. In the fertile pinnules there are from 10 to 14 sori on each pinnule.

The present species shows closest resemblances to *Pecopteris* (*Ptychocarpus*) *unita* Brongn., a species common in the Upper Coal Measures of England, and to *Pecopteris* (*Asterotheca*) *Cottoni* Zeiller from the Rhætic of Tonkin. It is not as completely known as the former, from which it differs certainly in the number of sporangia in the synangia, and also in the pinnules being always, as far as known, separate, not confluent for part of their length. The venation is apparently similar to that of *P unita* and the size of the pinnules is approximately the same.

Pecopteris (*Asterotheca*) *Cottoni* is a larger species than ours and differs from it in the venation, the secondary veins in the Tonkin species branching once and sometimes a second time. Fertile examples of these two species, apart from differences in size, are very similar to one another

To which genus of those with the Pecopteris type of foliage the present specimens belong, it will not be possible to determine definitely until examples are found with the synangia in a better state of preservation. They show a considerable degree of resemblance both to *Ptychocarpus* and *Asterotheca*, being apparently somewhat closer to the latter, in which the sporangia in a synangium are usually less in number than in the former and are also less closely united to one another (Scott, 1908, p. 279).

Ptychocarpus has been found only in Carboniferous Coal Measures, while *Asterotheca*, also an Upper Palæozoic genus, persists " in the Triassic and even Rhætic beds " (Scott, 1908, p. 350). *Pecopteris* (*Asterotheca*) *Cottoni* Zeiller occurs in the Rhætic beds of Tonkin.

Zeiller (1903, p. 26) placed *Scolecopteris australis* Shirley (1898, p. 17, Pl. 12) as a synonym of his *Pecopteris Cottoni* from Tonkin. It appears, however, that Shirley's specimens were more probably fertile examples of the species *Cladophlebis australis* (*see* Walkom, 1917, p. 3), and there was certainly not sufficient evidence preserved to allow them to be referred to *Scolecopteris.*

Both *Ptychocarpus* and *Asterotheca*, the two genera to which our specimens show most resemblance, belong to the Marattiales and it seems reasonable to place *P. Hillæ* as a member of this group.

No specimens similar to those now described have been recorded from

Australian Mesozoic rocks, and this species is named in honour of Mrs. Lumley Hill, whose enthusiasm is responsible for the collection of this valuable fossil plant material from the neighbourhood of Bellevue.

Locality.—Portion 42, Parish Wivenhoe (*F. 1582*).

TÆNIOPTERIS (? DANÆOPSIS) CRASSINERVIS (Feistm.).

(Plate XVIII., figs. 1, 2, and 3.)

Several specimens from Bellevue appear to be fertile examples of this species. The venation is similar to that in examples from Wycarbah (Walkom, 1917, Plate 1) in which the veins do not branch as frequently as indicated in Etheridge's description of the species (1892, p. 376).

The Bellevue specimens show a frond 8 cm. or more in breadth, with obtusely rounded apex: there is a very prominent midrib up to 8 mm. broad, striated longitudinally and, where eroded, showing internal structure consisting of an irregular series of anastomosing transverse strands. (Plate XVIII., fig. 1).

A similar structure appears to be present in some of the Indian specimens of *Danæopsis Hughesi* from the South Rewah basin, figured by Feistmantel (1882, pp. 25-27, Plates 4, 18) who, however, merely refers to this as transverse wrinkling of the rachis.

The secondary veins are almost at right angles to the midrib and are about 1 mm. apart; they branch but rarely and there are indications that they form a marginal vein at the edge of the lamina.

These secondary veins are in some specimens joined by a series of short irregular cross connections. Their irregularity lies in the fact that they are not always continuous from one vein to the next, but in these cases only reach about halfway. The explanation of this is provided by one specimen, of which the greater part shows the upper surface of the leaf, but in parts this is broken away and shows the series of transverse connections mentioned (Plate XVIII., fig. 1). Between the coarse veins in this specimen there can be seen one, occasionally two, very much finer veins (Plate XVIII., fig. 1). It is suggested that the cross connections mark the junction lines between adjacent sporangia and that the sporangia were aggregated in linear sori, placed between the veins and consisting of two rows of sporangia, the fine veins between the normal coarse ones marking the line of junction between the two rows of sporangia. Possibly where there are two of these fine veins the sporangia were more crowded and there were three rows. The dimensions of the sporangia would have been about ·75 x ·5 mm. Apparently the whole of the under surface was covered with the contiguous sporangia.

Unfortunately no detailed structure of the sporangia is preserved and it can only be suggested that the above interpretation is the correct explanation of the structure.

Halle (1921, p. 1) has given a full discussion of the genus *Danæopsis* and described a new species, *D. fecunda*, from fertile specimens. His specimens were well preserved and enabled him to work out the detailed structure of the sporangia.

I suggest the probability of the Australian *Tæniopteris crassinervis* belonging to *Danæopsis*, whose relation to recent genera of Marattiaceous ferns, as pointed out by Halle, is by no means clear.

Although a number of species of *Tæniopteris* have been described from Australian Mesozoic rocks, and specimens are very abundant on certain horizons, no fertile examples have yet been recorded or figured. The present examples from Bellevue, therefore, mark an advance in our knowledge of this common genus among Mesozoic plants. Australian species have at times been referred to such genera as *Angiopteridium* and *Oleandridium*, but this reference has been based entirely on the form of the leaf and the venation. From time to time I have pointed out that, although no Australian examples of *Tæniopteris* had been found showing the fertile characters, the English species *T. vittata* had been assigned to the Cycadophyta by H. H. Thomas (1915) and I therefore suggested the possibility of the Australian species belonging to the Cycads. It would seem now that one species, *T. crassinervis*, can be reasonably believed to be a marattiaceous fern, and we must therefore bear in mind the probability of other of our species of *Tæniopteris* belonging to the ferns.

Sterile examples of *T. crassinervis* in the collection do not differ from previously described specimens. One example (*F. 1583*) is a rather abnormal leaf in that the lamina is different in breadth on the two sides of the midrib, and has a lobed margin (Plate XVIII., fig. 3).

Locality.—Portion 42, Parish Wivenhoe (*F. 1577*); Portion 24, Parish Esk (*F. 1583*).

TÆNIOPTERIS CARRUTHERSI Tenison-Woods.

(Text-fig. 3.)

(*See* Q'land Geol. Surv., Pub. 257, p. 34.)

A number of specimens are referred to this species. One of them (*F. 1486a*) shows venation nearer to that originally described for the species than any I have previously examined. In this the secondary veins make a very acute angle with the midrib, but maintain this direction only for a distance of about 1 mm., when they curve outwards, and for the rest of their course they are at right angles to the midrib (Text-fig. 3). The secondary veins branch at varying distances from the midrib; near the midrib there are about 24 per cm., while near the margin they are more numerous.

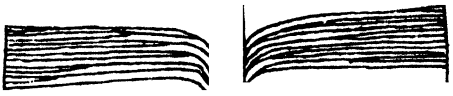


Fig. 3.—*Tæniopteris Carruthersi* Tenison-Woods. (× 2)

Locality.—Portion 32, Parish of Northbrook (*F. 1486a*).

TÆNIOPTERIS TENISON-WOODSI Etheridge Jr.

(*See* Q'land Geol. Surv., Pub. 257, p. 32.)

Several typical examples occur on a specimen from Portion 42, Parish Wivenhoe. They are narrow (6·5 to 8 mm. wide), strap-shaped, with acute apex, prominent midrib, and secondary veins making an acute angle with the midrib and branching occasionally.

Locality.—Portion 42, Parish Wivenhoe (*F. 1547*).

FILICALES INCERTÆ SEDIS.

? **SPHENOPTERIS PECTEN** Halle.

Some specimens bear a close general resemblance to *Sphenopteris pecten* described by Halle (1913, p. 35) from the Mesozoic flora of Graham Land. The frond is bi- (or tri-) pinnate, the pinnæ being alternate or opposite, narrow, elongate. The pinnules (or segments) are short (4 mm. long by 1·5–2 mm. wide), somewhat acute, and as far as can be seen each has a single vein. On account of the imperfect preservation I am not prepared to say whether the rachis is winged as in the specimens described by Halle. Our example may be compared with Halle's figures (1913, Pl. 4, figs. 21, 21*a*). They also show a resemblance to *Scleropteris crassa* Halle, also from Graham Land (cf. Halle, 1913, Pl. 4. fig. 5) but in this species the venation is different.

No specimens at all resembling the one under consideration here have been recorded previously from Queensland Mesozoic rocks.

Locality.—Portion 24, Parish Esk (*F. 1580*).

(?) **SPHENOPTERIS SUPERBA** Shirley.

Specimen *F. 1551* resembles in general appearance this species from the Ipswich Series (Shirley, 1898, p. 18; Walkom, 1917, p. 27). The specimen is imperfect and does not show the venation. It may also be compared with specimens described as *Callipteridium stormbergense* by Seward (1903, p. 58) from the Stormberg Beds of South Africa, and others described by Halle (1913, t. 4, fig. 5) as *Scleropteris crassa* from Graham Land.

Locality.—Portion 42, Parish Wivenhoe (*F. 1551*).

CYCADOPHYTA.

(? **NILSSONIA) SUPERBA,** n. sp.

(Plate XIX., fig. 1.)

Portions of some very large leaves are referred to a new species, placed doubtfully for the present in the genus *Nilssonia*. From the literature available to me it seems quite possible that the specimens represent a new genus, but, as none of them is complete, I hesitate to describe them as such. They seem

to be nearest to *Nilssonia* amongst the known Mesozoic genera, but there is a possibility also that they may represent a large species of *Tæniopteris*, such as *T. lata* from the Rajmahal Series in the Rajmahal Hills of India.

The leaves are large (length ?, breadth 24 cm. or more; in one specimen the length (incomplete) of a portion which is 13 cm. broad, is just over 13 cm.). The lamina is entire, traversed by numerous, simple, parallel veins (about 12 per cm.) almost at right angles to the rachis. In addition the lamina is coarsely wrinkled parallel to the veins, the wrinkles being most pronounced near the rachis and dying out before the margin is reached. As a result of the presence of these coarse wrinkles, the frond appears, on a casual glance, to be one of the Cycads such as *Zamites*, but closer examination leaves no doubt that the lamina is entire.

It is unfortunate that no complete examples have been found.

Locality.—Portion 42, Parish Wivenhoe (*F. 1463*).

PTEROPHYLLUM NATHANI, n. sp.

(Plate XX., figs. 1 and 2.)

Frond large; pinnæ long, narrow (to 5 cm. long, 5 mm. wide), parallel-sided, contiguous or distant, with bluntly pointed tips, slightly expanded at base; rachis prominent, 4-5 mm. wide, more or less wrinkled longitudinally; veins fine, 4-5 per mm., parallel, only occasionally branching.

The largest specimen is portion of a frond, 15 cm. long, the complete frond apparently being considerably longer.

Two specimens (*F. 1479* and *F. 1480*) are referred to this species, the only difference between them being that in *1479* the bases of the pinnæ are up to 4 mm. apart, whereas in *1480* they are contiguous. In the latter specimen the pinnæ became curled up before fossilisation, and as a result they appear to taper gradually to an acute point. (Plate XX., fig. 1.)

The determination and definition of many species of *Pterophyllum* are not easy, but the present specimens differ from species that have previously been described from Queensland in the proportions of the pinnæ (relative length and breadth) and in the fineness of the venation; whether they are conspecific with any of the species described from other parts of the world is difficult to determine without the opportunity of comparison with type material.

Pterophyllum Nathani may be compared with such species as *P. Jægeri* Brongniart from the Keuper of Stuttgart (cf. Seward, 1917, p. 553, fig. 610), with the description of which it agrees closely, except that the ends of the pinnæ are more rounded in *P. Jægeri.*

Other similar species are *P. æquale* recorded by Nathorst from the Rhætic of Scania, and by Zeiller from the Rhætic of Tonkin; *P. Braunianum,* another Rhætic form, in which the pinnæ are narrower than in our specimens; and *P. Tietzei* from the Rhætic of Persia and Tonkin. A somewhat similar species occurs in the Burghersdorp Beds of Triassic age, in South Africa (Seward, 1908, p. 103).

Another species to which the present one shows some resemblance is *P. Kingianum* from the Jurassic (Liassic) flora of the Rajmahal Group (Feistmantel, 1877, Pl. 3, fig. 1 and Pl. 4, fig. 1).

The species is named in honour of Sir Matthew Nathan, Governor of Queensland, whose interest in the Queensland Museum was largely responsible for bringing this collection of fossil plants to that Institution.

Locality.—Portion 42, Parish Wivenhoe (*F. 1479, F. 1480*).

PSEUDOCTENIS EATHIENSIS (Richards).

(Plate XIX., fig. 2.)

(*See* Q'land Geol. Surv., Pub. 259, 1917, p. 19, Pl. 7.)

Further specimens, similar to those already recorded from several localities in the Esk district (Walkom, 1917*a*, p. 19), are in the Bellevue collection.

Locality.—Portion 24, Parish Esk (*F. 1186*); Portion 42, Parish Wivenhoe (*F. 1471*).

PODOZAMITES LANCEOLATUS (?) (Lindley and Hutton).

(Plate XXI., fig. 3–A.)

A few small lanceolate leaves, 2·5–3 cm. in length and 4 mm. wide, possibly belong to this species. Very similar isolated examples have been figured from India by Feistmantel (1877*a*, Plate IV.).

Locality.—Portion 42, Parish Wivenhoe (*F. 1469*).

GINKGOALES.

GINKGOITES SIBIRICA ? Heer.

(Plate XXI., fig. 4.)

(*See* Seward, Fossil Plants, Vol. IV., 1919, p. 24.)

The generic name *Ginkgoites* has been proposed by Seward (1919, p. 11) for fossil leaves that "it is believed belong either to plants generically identical with *Ginkgo* or to very closely allied types."

Specimen *F. 1553* may be referred to *G. sibirica*, first described by Heer from plant beds near Irkutsk in Siberia. This specimen agrees very closely with a figure (Seward 1919, fig. 635*e*) reproduced after Heer's figure of the species. The species, as is the case with most species of *Ginkgoites*, shows considerable variation in the leaf form, and Seward (1919, p. 24) has suggested the retention of the name for "leaves similar to some of the more deeply divided forms of *G. digitata* and to *G. pluripartita*, but normally characterised by a lamina divided almost or quite to the base into oblong, obtuse or more or less acute segments."

The present example is a little over 5 cm. from base to outer margin; it is, near the base, divided into four segments, each about 1 cm. wide, and each of these segments is again divided twice. The veins divide frequently and there are about 18-20 per cm.

The specimen differs from any of those so far found in Queensland. It has not been considered advisable to suggest a new specific name for this example, in view of the wide distribution of certain types of *Ginkgo* leaf and the already long list of species described for this genus. *Ginkgoites sibirica* is mainly a Jurassic type.

The species *Baiera moltenensis* from the Molteno beds, of Rhætic age, in South Africa (Seward, 1908, p. 99) is somewhat similar to this Queensland specimen.

Locality.—Portion 24, Parish Esk (*F. 1553.*)

GINKGOITES DIGITATA (Brongniart).

(*See* Q'land Geol. Survey, Pub. 259, 1917, p. 8, Pl. 1.)

A single specimen belongs to this species. The leaf is only divided for a short distance from the margin, the indentations in no place reaching more than halfway towards the base. There is a very distinct median indentation, reaching nearly halfway to base, and several subsidiary ones. The whole margin does not show in the specimen, being partly broken or covered by rock. The leaf measures 3 cm. from base to margin and has the usual venation.

Locality.— Portion 24, Parish Esk (*F. 1540*).

GINKGOITES sp.

(Plate XXI., fig. 3-B.)

An isolated leaf is doubtfully referred to *Ginkgoites*. It is somewhat wedge-shaped, 3 cm. in length, 17 mm. broad in the upper part and 4·5 mm. at the base; it is traversed by veins, diverging from the basal portion, about 1 mm. apart and branching dichotomously at intervals.

Locality.—Portion 42, Parish Wivenhoe (*F. 1469*).

BAIERA BIDENS Tenison-Woods.

(Plate XXI., fig. 2.)

(*See* Q'land Geol. Surv., Pub. 259, 1917, p. 11, Pl. 3.)

This species, which has previously been recorded from Denmark Hill (Ipswich) and Yeronga (Walkom, 1917*a*, p. 11) is present in the collection from Bellevue, the specimen figured (*F. 1470*) being a fine example showing the form of the leaf.

Locality.—Portion 42, Parish Wivenhoe (*F. 1470*); Portion 24, Parish Esk (*F. 1546*).

BAIERA SIMMONDSI (Shirley).

Specimen *F. 1488* is probably portion of a leaf belonging to this species. The complete leaf is more than 12·5 cm. from base to outer margin, and is deeply divided into a number of segments. These segments appear to be broader than in any examples of the species that have come under my notice.

The species has previously been described from Denmark Hill (Ipswich) and Coal Creek near Esk. (*See* Walkom, 1917*a*, p. 10.)

Locality. - Portion 24, Parish Esk (*F. 1488*).

PHŒNICOPSIS ELONGATUS (Morris).

Specimen *F. 1475* shows a cluster of long narrow leaves for which possibly the generic name *Desmiophyllum* would be more suitable than *Phœnicopsis*. They are 14 cm. or more long, 1·5 cm. broad, and taper gradually to the base; they are traversed by a number (about 20) of parallel veins.

Similar specimens have been described from beds near Esk (Walkom, 1917*a*, p. 27) but this example is more complete than any hitherto described from Australia. It shows four leaves with their bases close together, suggesting the habit of such species as *Phœnicopsis speciosa* from the Jurassic of Siberia (Seward, 1919, p. 73).

Similar incomplete leaves have been described by Nathorst from the Rhætic beds of Sweden.

On the same specimen a stem of *Neocalamites hoerensis* lies near the bases of the Phœnicopsis leaves.

Locality.—Portion 42, Parish Wivenhoe (*F. 1475*).

GYMNOSPERMOUS SEEDS.

(1.) Specimen *F. 1469* shows an indistinct impression (*C*), possibly a gymnospermous seed. Only the general shape can be made out, the seed being oval in outline, its dimensions being 3 cm. x 2·2 cm. (Plate XXI., fig. 3, C.)

Locality.—Portion 42, Parish Wivenhoe.

(2.) On specimen *F. 1582* there is an example (Plate XVII., fig. 1, D) similar to one figured from Denmark Hill (Ipswich) (Walkom, 1917*a*, p. 27, Pl. 8, fig. 7). Attention was previously drawn to the resemblance exhibited by this type to the female flowers of *Ginkgo* (cf. Seward and Gowan, 1900, Pl. 9, fig. 6).

Locality.—Portion 42, Parish Wivenhoe.

LIST OF REFERENCES.

Etheridge, R., Jr., 1892	The Geology and Palæontology of Queensland and New Guinea. *Q'land Geol. Surv.*, Pub. 92.
Feistmantel, O., 1877	The Jurassic (Liassic) Flora of the Rajmahal Group from Golapili, near Ellore, S. Godaveri. *Foss. Flor. Gondwana Sm.* (Geol. Survey India, Palæontologia Indica), Vol. 1, Part 3.
Ibid., 1877*a*	The Flora of the Jabalpur Group (Upper Gondwanas) in the Son-Narbada Region. *Ibid.*, Vol. 2, Part 2.
Ibid., 1882	The Fossil Flora of the South Rewah Gondwana Basin. *Ibid.*, Vol. 4, Part 1.
Halle, T. G., 1913	The Mesozoic Flora of Graham Land. *Schwed. Sudpolar. Exped.*, 1901-1903, Bd. iii., Lief. 4.
Ibid., 1921	On the Sporangia of some Mesozoic Ferns. *Arkiv för Botanik*, Bd. 17, No. 1.
Scott, D. G., 1908	Studies in Fossil Botany. Vol. i. (2nd Ed.).
Seward, A. C., 1900	The Jurassic Flora, Part 1. *British Mus. Catalogue.*
Ibid., 1903	Fossil Floras of Cape Colony. *Ann. S. Af. Mus.*, Vol. iv., pt. 1.
Ibid., 1908	Fossil Plants from South Africa. *Quart. Journ. Geol. Soc.*, lxiv., pp. 83-108.
Ibid., 1917	Fossil Plants, Vol. iii.
Ibid., 1919	Fossil Plants, Vol. iv.
Seward, A. C., and J. Gowan, 1900	The Maidenhair Tree (*Ginkgo biloba*). *Ann. Bot.*, xiv., p. 109.
Shirley, J., 1898	Additions to the Fossil Flora of Queensland. *Qland. Geol. Surv.*, Pub. 128.
Thomas, H. H., 1915	On *Williamsoniella*, a new type of Bennettitalean Flower. *Phil. Trans. Roy. Soc.*, Vol. 207, p. 113.
Walkom, A. B., 1915	Mesozoic Floras of Queensland, Pt. 1. *Q'land Geol. Surv.*, Pub. 252.
Ibid., 1917	Mesozoic Floras of Queensland, Pt. 1 (contd.). *Q'land Geol. Surv.*, Pub. 257.
Ibid., 1917*a*	Mesozoic Floras of Queensland, Pt. 1 (concluded). *Q'land Geol. Surv.*, Pub. 259.
Zeiller, R., 1903	Flore fossile des Gîtes de Charbon du Tonkin. *Etudes Gîtes Min. France.* Paris.

Explanation of Plates XV.—XXI.

Unless otherwise stated, figures are natural size.

PLATE XV.

Fig. 1.—*Neocalamites hoerensis* (Schimper).

Fig. 2.—*Cladophlebis lobifolia* (Phillips). (Slightly reduced.)

Fig. 3.—*Thinnfeldia lancifolia* (Morris). (Slightly reduced.)

PLATE XVI.

Schizoneura sp. a. Fig. 1 (× ·4); Fig. 2 (× ·3).

PLATE XVII.

Fig. 1—A, B. *Pecopteris* (*Asterotheca*) *Hillæ* Walkom. (Slightly reduced.)
C. *Ginkgoites* sp.
D. Gymnospermous seed.
E. *Cladophlebis australis* (Morris).
F. *Thinnfeldia Feistmanteli* Johnston.

Fig. 2.—*Pecopteris* (*Asterotheca*) *Hillæ* Walkom. Sterile pinna. (× 2·5.)

Fig. 3.—*Pecopteris* (*Asterotheca*) *Hillæ* Walkom. Fertile pinna. (× 2·5.)

PLATE XVIII.

Fig. 1.—*Tæniopteris* (? *Danæopsis*) *crassinervis* (Feistm.). (× 2.)
About the middle of the figure and to the left of the midrib the finer veins between the coarse ones can be seen.

Fig. 2.—*Tæniopteris* (? *Danæopsis*) *crassinervis* (Feistm.).

Fig. 3.—*Tæniopteris crassinervis* (Feistm.).

PLATE XIX.

Fig. 1.—(? *Nilssonia*) *superba* Walkom. (× ·4.)

Fig. 2.—*Pseudoctenis eathiensis* (Richards). (× ·8.)

PLATE XX.

Figs. 1, 2.—*Pterophyllum Nathani* Walkom. (× ·75.)

PLATE XXI.

Fig. 1.—*Dictyophyllum rugosum* L. & H. (× ·9.)

Fig. 2.—*Baiera bidens* Tenison-Woods. (× ·8.)

Fig. 3.—A. *Podozamites lanceolatus ?* (L. & H). (× ·7.)
B. *Ginkgoites* sp.
C. Gymnospermous seed.

Fig. 4.—*Ginkgoites sibirica ?* Heer.

CYLINDRICAL STONE IMPLEMENT.

By E. O. Marks, M.D., B.A., B.E.

Plate XXII., figures 1 and 2.

[Editor's Note.—The Queensland Museum recently received through Dr. E. O. Marks a sub-cylindrical stone implement 219 mm. in length, with a maximum diameter of 51·5 mm., tapering to 35 mm. The cutting edge is evenly chamfered, as shown in Plate XXII., figures 1 and 2. This implement is of such unusual contours that it is desirable to place Dr. Marks's notes on record.]

Discovery.—Mr. A. H. Blackman, Surveyor, who sent the stone implement to my father, has kindly supplied the following information in regard to its discovery. It was ploughed up from a depth of nine inches, during the preparation of the ground for a first cotton crop, on a flat spur of sandy loam which had previously been cleared of brigalow and sandalwood scrub. The locality is at the junction of Palm Tree Creek and the Dawson River, eight miles north a little east from Taroom, and one and a-half mile from the aboriginal settlement.

Description.—The implement has been made from an altered basic intrusive rock of the nature of a diabase, consisting of a fine-grained base, with numerous phenocrysts of dark mineral, probably a pyroxene, and occasional decomposed white phenocrysts. It has evidently been exposed to the weather for a considerable period, for the surface is roughened and pitted and covered by a brown ferruginous coating. The latter is probably largely the result of deposition upon the surface, but where scraped by the plough the coating is seen to merge into weathered rock, and this into the unweathered portion exposed in the deepest part of the cut.

Anthony James Cumming, Government Printer, Brisbane.

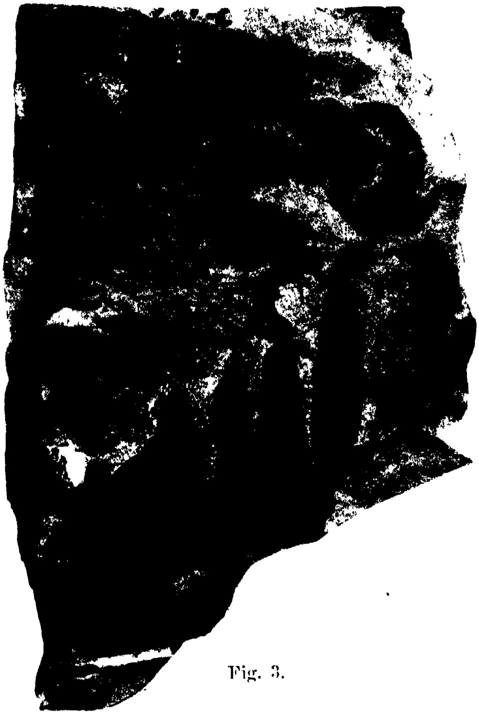
PLATE XV.

Fig. 1.—*Neocalamites hoerensis* (Schimper). (Natural size.)

Fig. 2.—*Cladophlebis lobifolia* (Phillips). (Slightly reduced.)

Fig. 3.—*Thinnfeldia lancifolia* (Morris). (Slightly reduced.)

Fig. 1.



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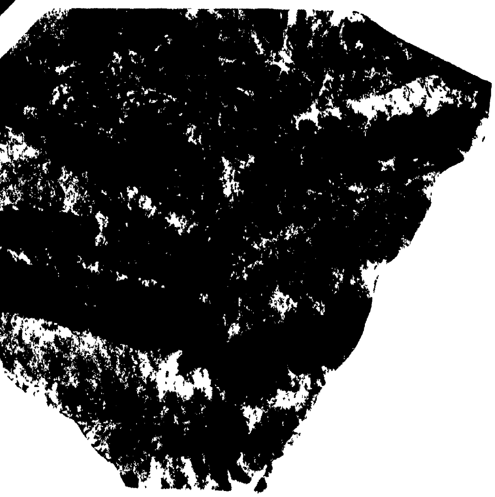


Fig. 2.

PLATE XVI.

Schizoneura sp. *a* Fig. 1 (×·4); Fig. 2 (×·3).

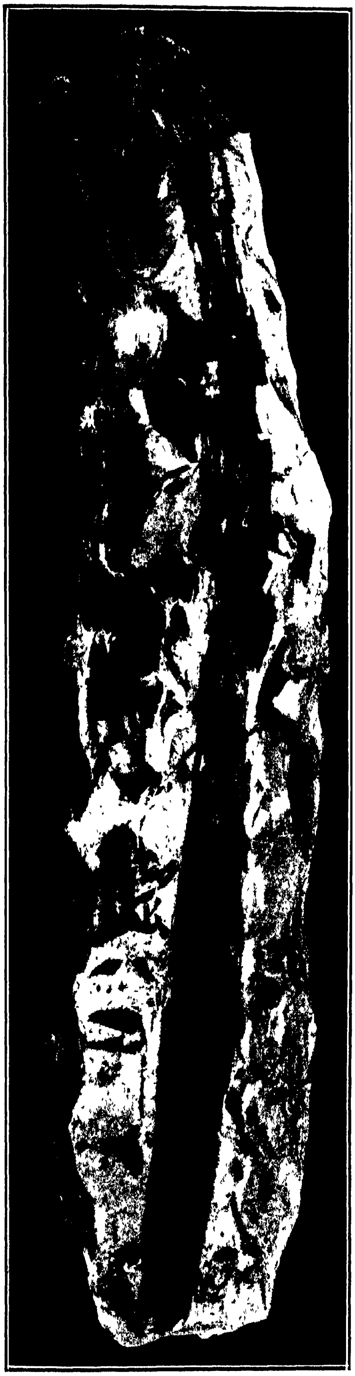


Fig. 1.

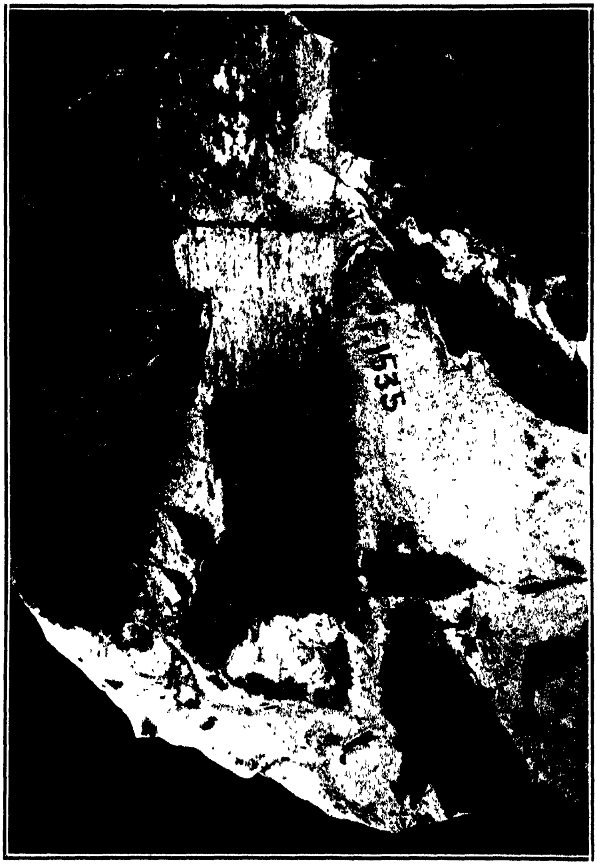


Fig. 2.

PLATE XVII.

Fig. 1.—A, B. *Pecopteris* (*Asterotheca*) *Hillæ* Walkom. (Slightly reduced.)

C. *Ginkgoites* sp.

D. *Gymnospermous seed.*

E. *Cladophlebis australis* (Morris).

F. *Thinnfeldia Feistmanteli* Johnston.

Fig. 2.—*Pecopteris* (*Asterotheca*) *Hillæ* Walkom. Sterile pinna. (× 2·5.)

Fig. 3.—*Pecopteris* (*Asterotheca*) *Hillæ* Walkom. Fertile pinna. (× 2·5.)

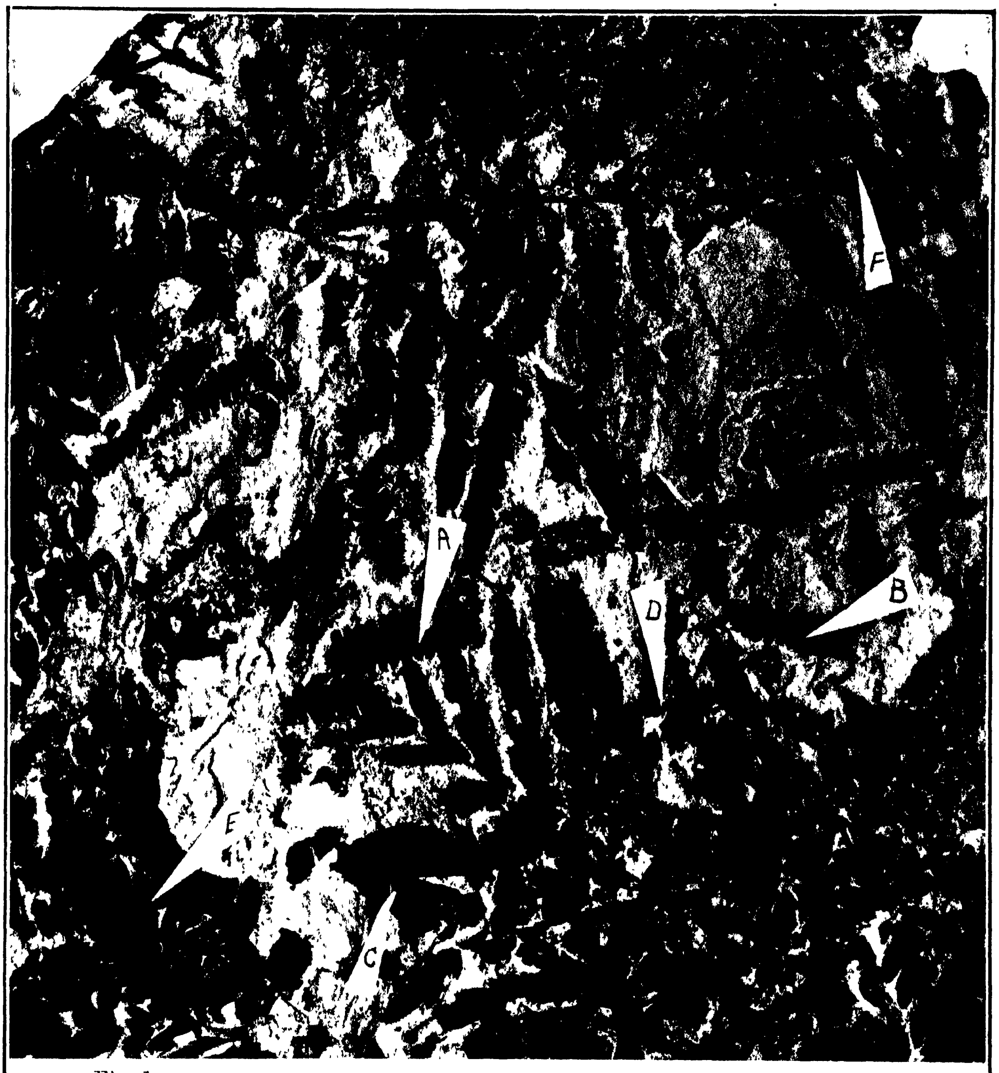


Fig. 1.

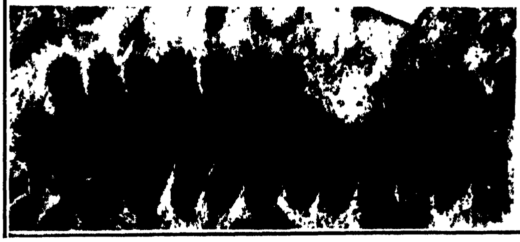


Fig. 2.

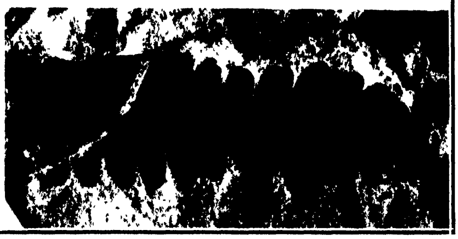


Fig. 3.

PLATE XVIII.

Fig. 1.—*Tæniopteris* (*? Danæopsis*) *crassinervis* (Feistm). (× 2.) About the middle of the figure and to the left of the midrib the finer veins between the coarse ones can be seen.

Fig. 2.—*Tæniopteris* (*? Danæopsis*) *crassinervis* (Feistm). (Natural size.)

Fig. 3.—*Tæniopteris crassinervis* (Feistm). (Natural size.)

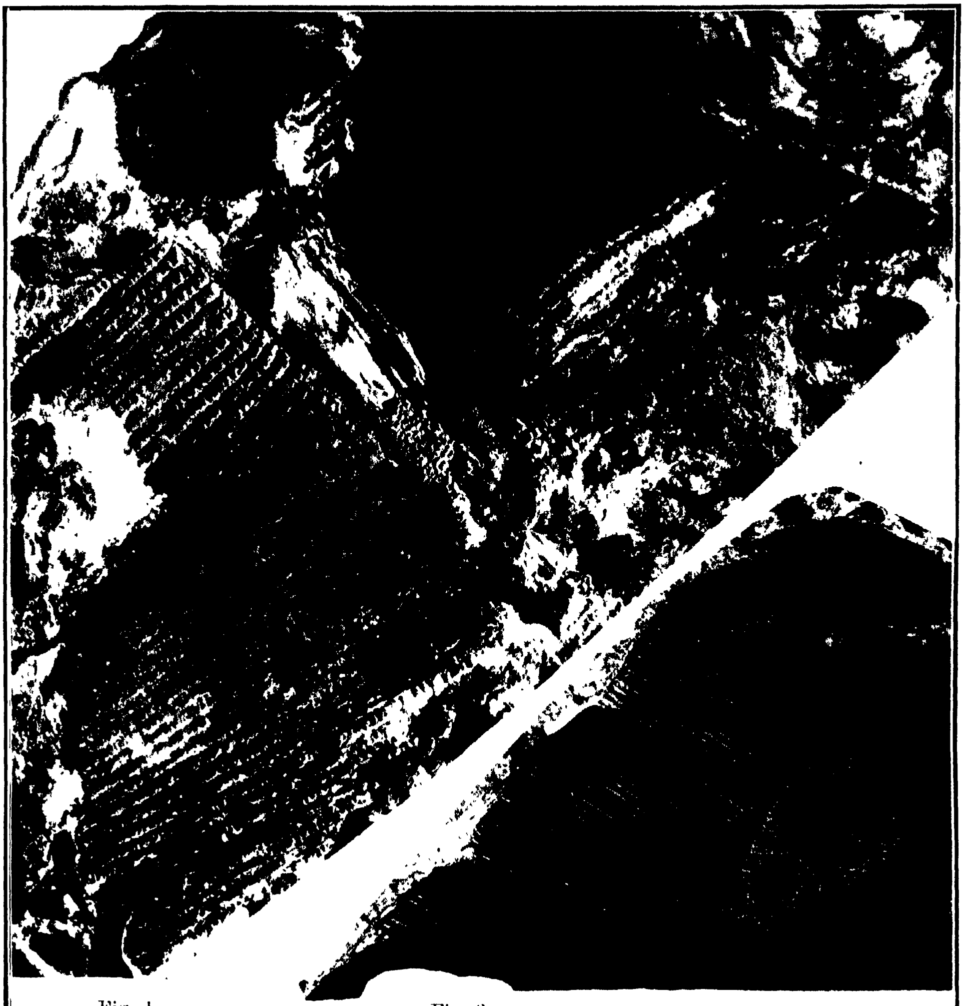


Fig. 1.

Fig. 2.

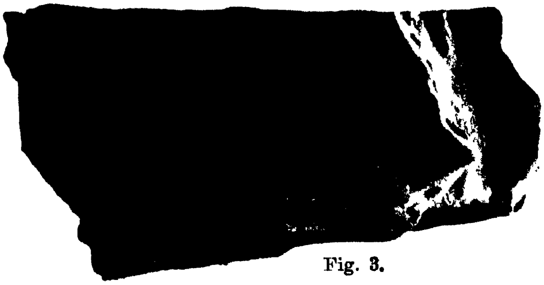


Fig. 3.

PLATE XIX.

Fig. 1.—(*? Nilssonia*) *superba* Walkom. (×·4.)

Fig. 2.—*Pseudocentis eathiensis* (Richards). (×·8.)

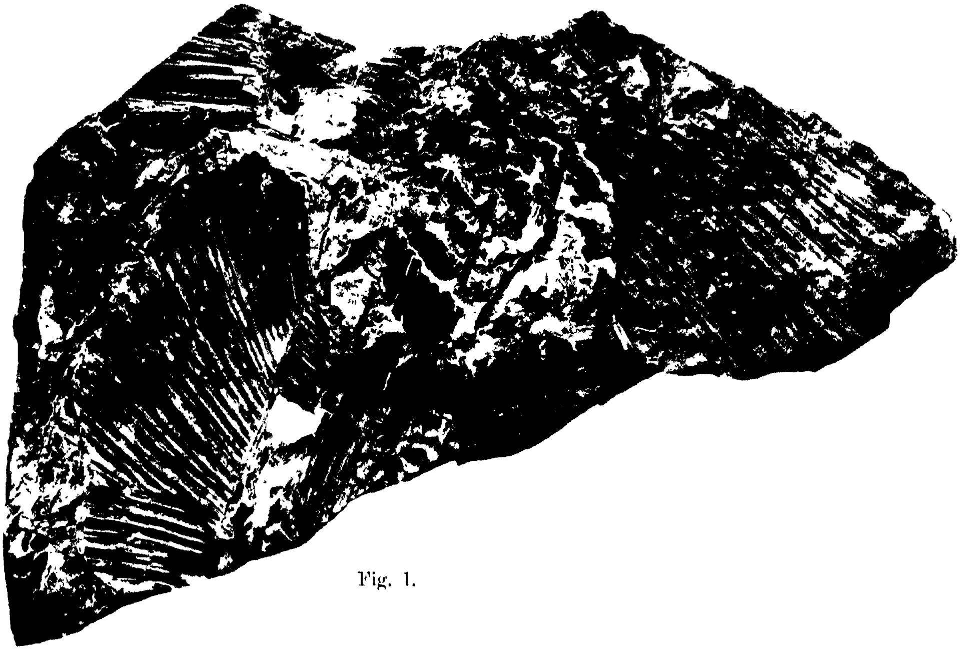


Fig. 1.

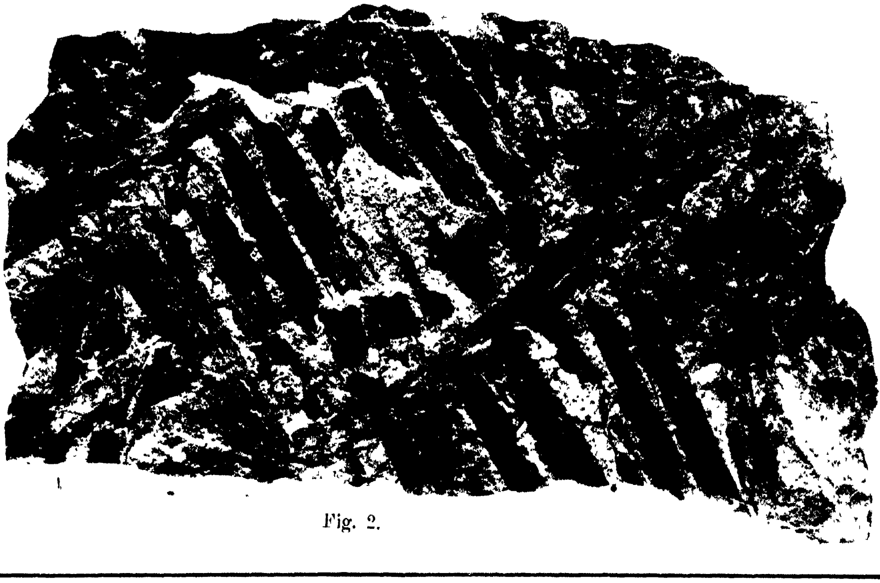


Fig. 2.

PLATE XX.

Figs. 1 and 2.—*Pterophyllum Nathani* Walkom. (×·75.)

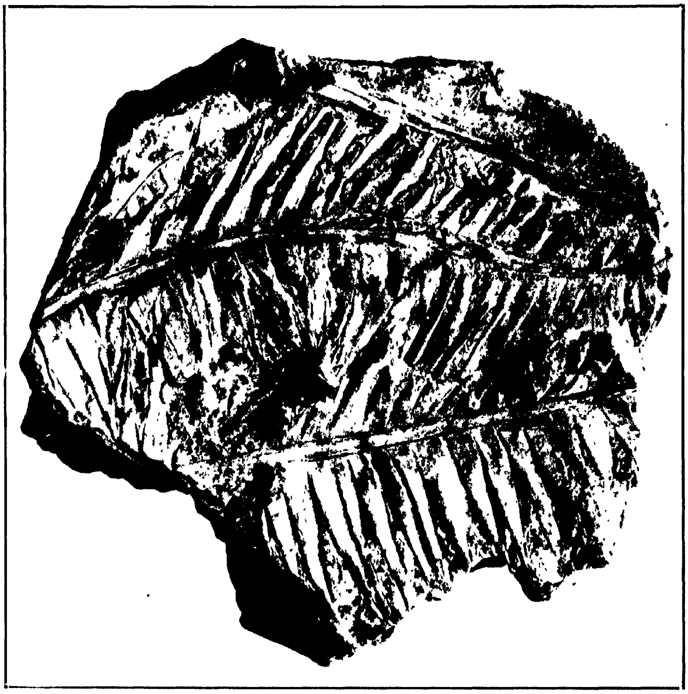


Fig. 1.

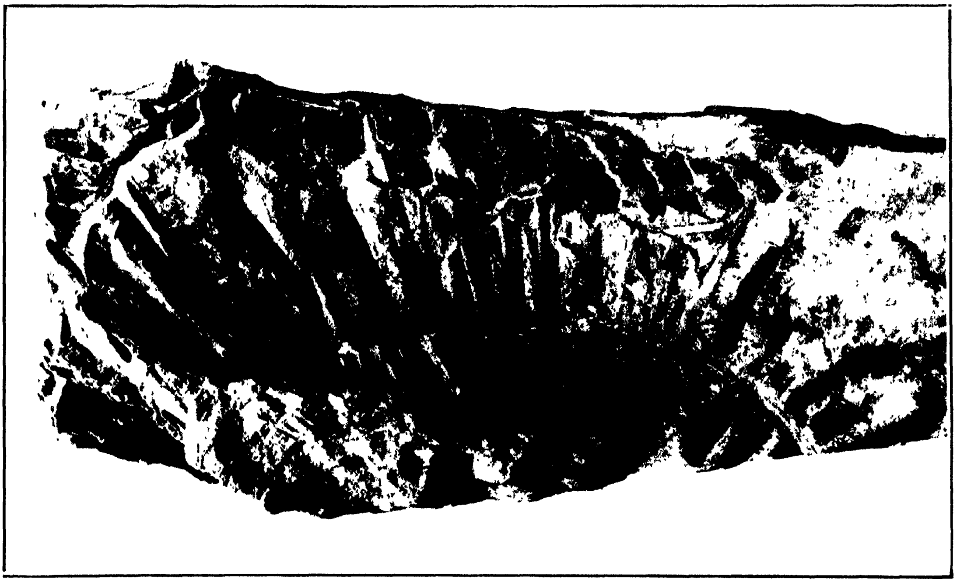


Fig. 2.

PLATE XXI.

Fig. 1.—*Dictyophyllum rugosum* L. & H. (×·9.)

Fig. 2.—*Baiera bidens* Tenison Woods. (×·8.)

Fig. 3.—A. *Podozamites lanceolatus* ? (L. & H.). (×·7.)
B. *Ginkgoites* sp.
C. Gymnospermous seed.

Fig. 4.—*Ginkgoites sibirica* ? Heer. (Natural size.)

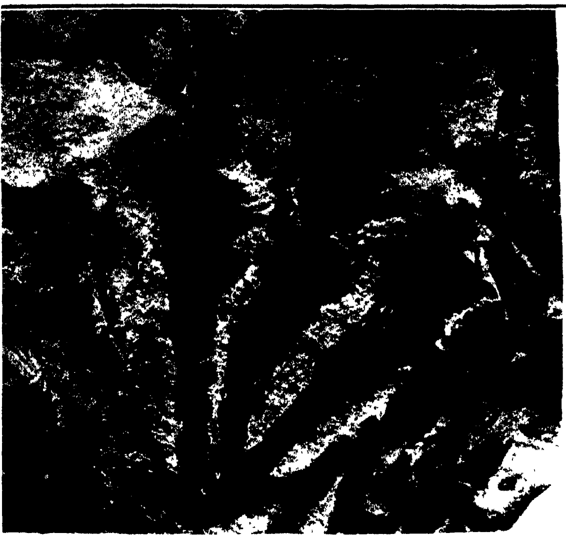


Fig. 1.

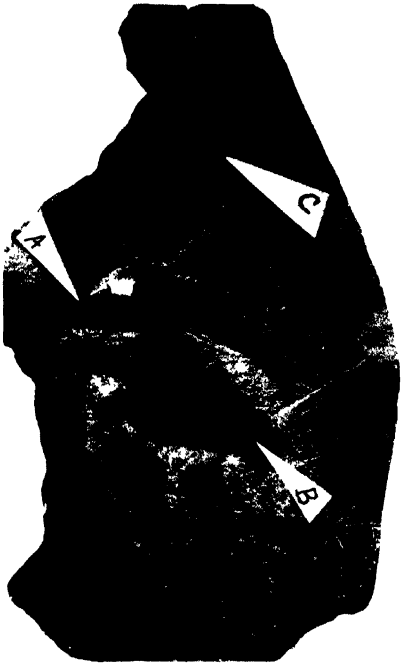


Fig. 3.

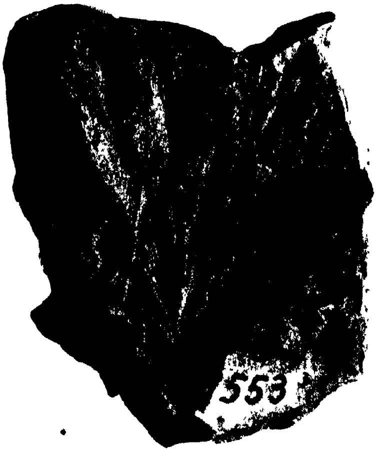


Fig. 4.

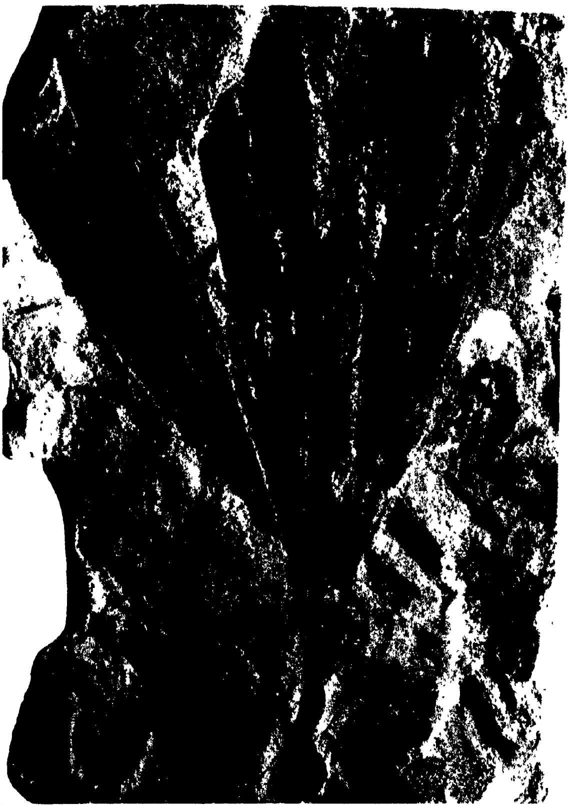
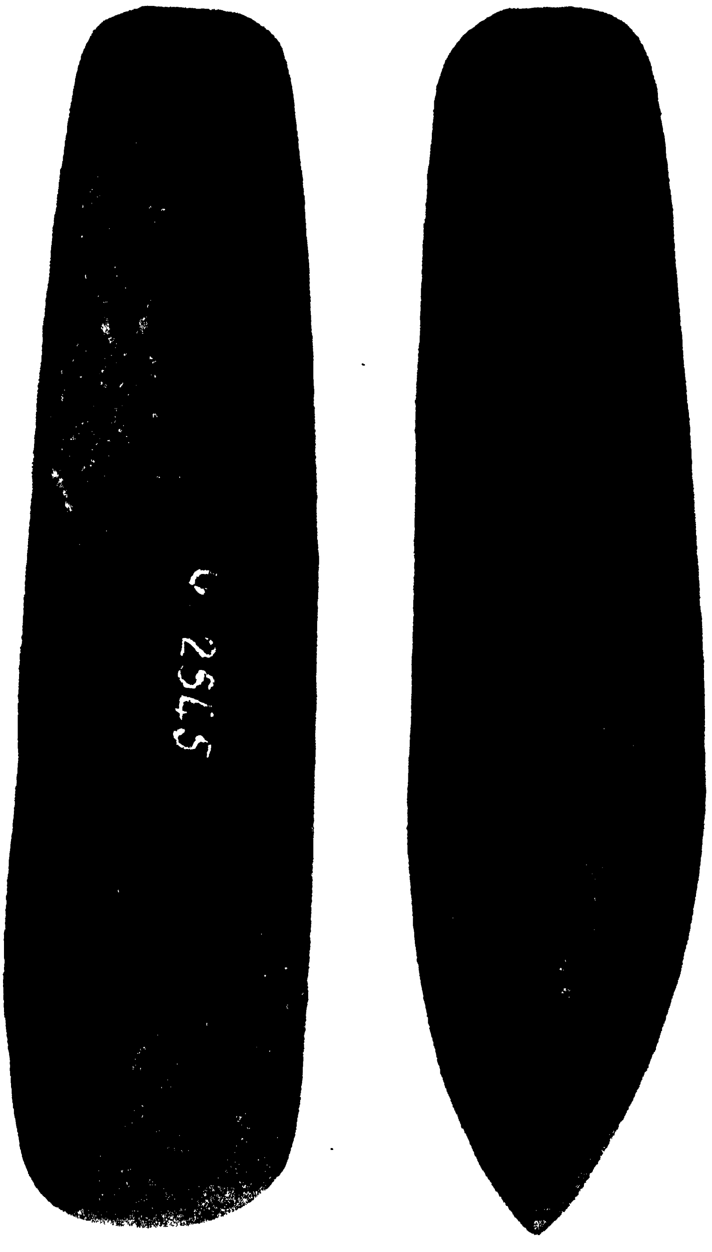


Fig. 2.



Figs. 1 and 2.- Queensland Stone Implement.

MEMOIRS OF THE QUEENSLAND MUSEUM, Vol. VIII., Part II.

CROCODILUS JOHNSONI KREFFT.

By Heber A. Longman, Director.

(Plates XXIII–XXIV.)

Although described by Krefft so long ago as 1873, but little attention has been given to the Long-snouted or Freshwater Crocodile, *Crocodilus johnsoni.* In his valuable studies of skull characters of recent Crocodilia, C. C. Mook was able to give only a brief description, owing to absence of material. The following notes are mainly based on cranial material, but some other characters have been outlined and may be of value to systematists. A paper of this kind might be expanded into an elaborate monograph, but only such cranial and other characters as appear to be of special interest have been dealt with.

The following are references to literature :—

Crocodilus johnsoni, Krefft, Proc. Zool. Soc., 1873, p. 334-5.

Philas johnstoni, Gray, Proc. Zool. Soc., 1874, p. 177-8, Pl. 27.

Crocodilus johnstoni, Boulenger, Brit. Mus. Cat. Chel., Rhynch & Croc., 1889, p. 279 (Port Darwin); F. Hann, Pr. Roy. Soc., Qld., xvi., 1901, p. 21 (Phillips River, West Australia); Ogilby, Pr. Roy. Soc., Qld., xviii., 1904, p. 201; xix., 1907, p. 4; Basedow, Pr. Roy. Geograph. Soc. Aus. (S.A. Br.) xviii., 1918, p. 226 (Forest River, North-West Australia); Lucas & Le Souef, Animals of Australia, 1909, p. 189, photograph from life by A. E. H. Mattingley; C. C. Mook, Bull. Amer. Mus. Nat. Hist., xliv., 1921, p. 173.

It will be noted that Krefft first described this crocodile specifically as *johnsoni*, but subsequently altered the spelling to *johnstoni*, as it was found by "Mr. Johnston, of Cardwell," Queensland.*

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* The late Sub-Inspector Robert Arthur Johnstone, of the Queensland Police, contributed to the Brisbane Press the following account of his discovery, for which I am indebted to Mr. Edgar Young, son-in-law, who is Honorary Collector to the Queensland Museum :—

"The Herbert is the only eastern water in Australia in which is found the *Crocodilus johnstonii*, so named after the writer, who sent the first named specimen down which he shot in the Herbert, near the mounted police camp, at Cashmere, on the Upper Herbert. When I shot it I thought it was a freak, and not a distinct species, but sufficiently peculiar to forward as a Museum specimen; but after shooting many specimens all possessing the same peculiarities, I was satisfied it was a new species, being much smaller and perfectly harmless, as was proved by the fact of the piccaninnies, puppies, and all hands constantly "bogeying" in the same reach of the river where the crocodiles were seen daily. Of all the numbers I shot I carefully opened them to examine the state of the larder, and never found anything larger than a water rat in it, with some lobster shells, stones, and moss, in each case the largest quantity being stone pebbles, to help digestion, I presume. The skin and flesh have a very strong smell of musk; in fact, after opening one it is impossible to get rid of the smell of musk for days, no matter how one tries. They are only found above the Herbert Falls, and the *C. porosus* below the falls. . . . *C. johnstonii* is harmless, and makes a nest of leaves, grass, and sand, forming a mound in which the eggs are buried."

Material.—The specimens in the Queensland Museum are—

J. 4279. A juvenile, 295 mm., in spirits. Wickham River, off Victoria River, Northern Territory, Mrs. T. Graham.

J. 4283. A mounted specimen, juvenile, 740 mm. Locality doubtful.

J. 4278. A mounted specimen, 2,273 mm. Burketown, F. H. Hann.

J. 2788. Skin and skull, 2,343 mm. Hulbert's Hole, Flinders River, 35 miles below Richmond, N.W. Qld., F. L. Berney.

J. 4277. Skin and skull, smaller than above, damaged; same locality.

There are also four isolated crania, the largest (*J. 4286*) being 398 mm. from the anterior end of snout to the supra-occipital, and the smallest 262 mm.

The skin and skull sent in by Mr. F. L. Berney, from the Flinders River, 7 ft. 8¼ in. or 2,343 mm. in length, appears to be the record for the species (length of skull, snout to supra-occipital 375), but as the aged skull (*J. 4286*) is considerably larger it is obvious that this freshwater Crocodile reaches about 8 ft.

Chief Cranial Characters.—Skull small, with elongated snout. Cranial table flattened. Premaxillæ but little expanded; bony nasal septum absent; no very dominant notches. Anterior portion of nasals sometimes hidden beneath premaxillaries. Dentition: Upper jaw 19 to 21; lower jaw 15 to 17, with occasional presence of double functioning teeth. Frontal-parietal suture anterior to supratemporal fenestræ; maxillo-palatine sutures extending far anterior to palatine fenestræ. Quadrato-jugals with anterior fenestral processes. Mandibular symphysis ends between 6th and 7th teeth; splenial extending forward nearly to symphysis.

Superior Surface.—In general contours the skull resembles that of *Crocodilus cataphractus*, which in turn approaches that of *Tomistoma schegeli.* The distance from the anterior border of the orbits to the tip of the snout is more than twice the breadth at the termination of the dental arcade in old specimens, and nearly three times this breadth in immature specimens.

Premaxillaries.—These are much longer than broad, and have prolonged posterior processes near the median line which may extend as far back as the third maxillary teeth, and which separate the nasals from the maxillæ in this region. The maximum length apart from the processes is at least twice the breadth at the notches. Except in the largest cranium these bones are not greatly expanded laterally beyond the line of the maxillaries. There are three lateral notches for the accommodation of the second, third, and fourth mandibular teeth on each side, the latter being the largest. The external narial aperture is somewhat variable in shape in the four specimens examined, being oval in the smaller and almost circular in the largest cranium. It is slightly smaller than a supratemporal fenestra. The anterior border is relatively smooth. The premaxillo-maxillary suture passes obliquely and irregularly backward to the attenuated processes, from whence it passes back at a very acute angle to the end of the bone and then returns forward, also very acutely, beside the nasal to meet its fellow on the median line. This suture is not completely shown on Plate XXIII.

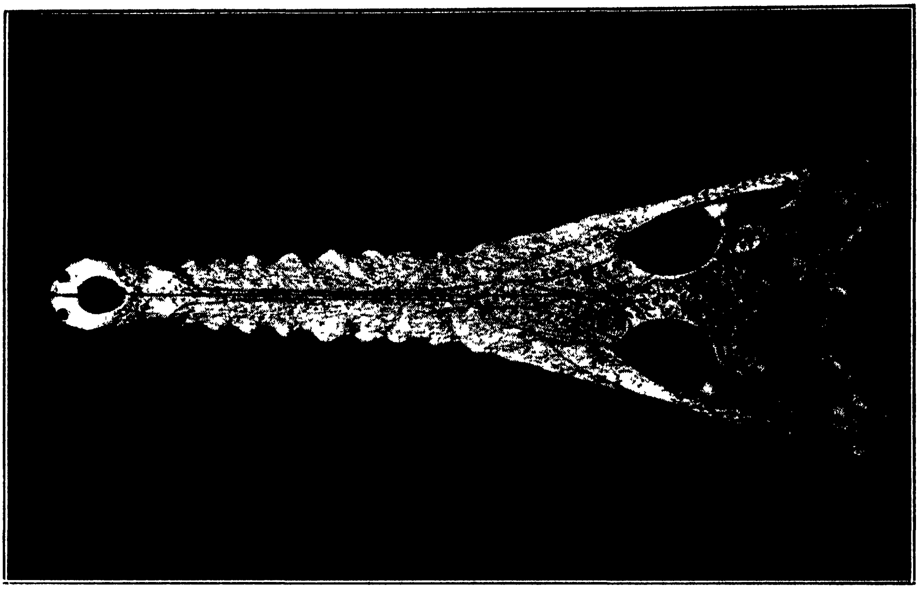

Fig. 1.—*Crocodilus johnsoni.* Superior surface of cranium. J. 4280. Length 266 mm.

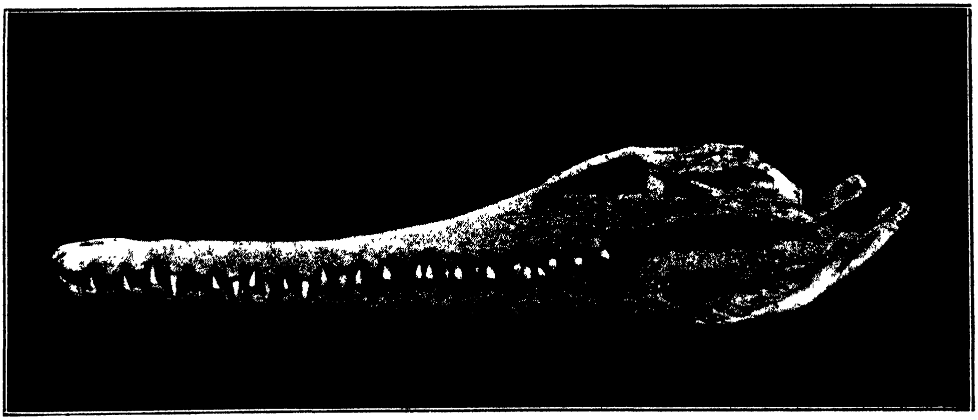

Fig. 2.—*Crocodilus johnsoni.* Lateral view of cranium. J. 4280.

Maxillaries.—These elongated bones form by far the greater portion of the preorbital region, and owing to the narrowness of the nasals their superior borders come very close to each other. Boulenger's statement that the maxillaries form a median suture above, behind the nasal opening, is incorrect for our specimens, and Mook interprets "maxillaries" as a misprint for premaxillaries. The nasal bones are so attenuated, however, that it would not be surprising if specimens were found in which the second anterior elements actually met in the median line, hiding the nasals for a short distance. The length of the maxillo-nasal suture, which is fairly straight, is about equal to the maximum breadth of the maxillæ at the posterior end of the dental arcade. The suture with the lachrymal is less than half the length of that with the jugal or malar. In transverse section the maxillæ are very convex, and, except in the posterior region, the lateral borders are prominently notched for the accommodation of the mandibular teeth.

Nasals.—These are the most attenuated bones of the skull, the maximum length being about ten times the greatest breadth. Examination of a partially disarticulated skull shows that the anterior fifth, or so, of the nasals may be prolonged beneath the premaxillaries, and it seems probable that the extreme points always reach the external nares. On the surface the acuminate anterior processes separate the posterior branches of the premaxillæ. Posteriorly the nasals are divided by the frontal process. The relative proportions of the sutures with the lachrymals and with the prefrontals vary somewhat in the four crania examined, but the areas of contact are about equal. The nasals attain their maximum breadth opposite the anterior ends of the lachrymals.

Lachrymals.—These bones are broader and longer than the prefrontals; anteriorly they appear to broaden with age, and the inner and lateral borders are parallel in the prefrontal region. The suture with the prefrontal is about two and a-half times as long as that with the nasal. The suture with the jugal is about equal to the length of the orbit. On the postero-internal border near the ventral surface there is a large single opening for the lachrymal duct. The orbital border is not prominently raised.

Prefrontals.—These bones are sub-triangular, but the frontal border is curved inwards and the anterior processes are wedged between the nasals and lachrymals. The suture with the nasal is about half the length of that with the frontal. The anterior border of the orbit is formed by the prefrontal and lachrymal in about equal proportions.

Frontal.—The length of this bone is slightly greater than the breadth of the cranial table, about half being formed by the acuminate anterior process, which divides the nasals for a short distance. The widest portion is just posterior to the suture with the postfrontals. The posterior border is curved backwards. From the beginning of the suture with the prefrontals the bone is sharply curved inwards to the anterior process. The portion between the orbits is very concave in immature skulls, but flattens with age. The orbital border is not ridged as in *C. porosus*.

Orbits.—In young specimens the transverse diameter of the orbit is greater than that of the frontal, but in mature and aged examples these proportions are reversed. Each cavity is much larger than the infratemporal vacuity and tends to become more oval with age.

Cranial Table.—The supraoccipital, parietal, squamosals, postfrontals, and the posterior portion of the frontal form a flat cranial table, but the anterior elements are elevated to form the raised border of the orbits. The plane of this table is parallel with that of the dental arcade. The lateral borders slightly converge anteriorly and the posterior border is a double curve. The nterorbital region is concave, especially in half-grown specimens. The pits in this area are deeper than elsewhere.

The supratemporal fenestræ are oval cavities, with obliquely sloping internal borders. The transverse diameter of each is about equal to the interorbital space. The parietal contributes the internal moiety, whilst the squamosal section exceeds that of the postfrontal. The junction of the parietal, frontal, and postfrontal sutures is about midway between the cavity and the orbits.

The ratios of the breadth of the cranial table and that of the cranium across the quadrato-jugals in juvenile and old specimens are similar to those recorded by C. C. Mook for *Crocodilus americanus* (loc. cit., p. 59). In our juvenile specimen 295 mm. in length, the breadth of the cranial table is almost equal to that of the cranium, being 18 mm. as compared with 22 mm. In our largest skull, 398 in length, the breadth of the cranial table, taken across the centres of the fenestræ, is 87 mm., whereas the maximum at the quadrato-jugals is 198.

Jugals.—The zygomatic bones are only exceeded in length by the maxillæ and nasals, and even in the oldest specimen the vertical depth is contained over four times in the length. The portion in front of the postorbital process is about equal to that behind, which reaches almost to the region of the articular facets of the quadrate.

Quadratojugals.—The anterior processes of these bones are acutely pointed and extend about half way across the infratemporal fenestræ. The area of contact with the quadrate is much greater than that with the jugal. The lateral borders converge somewhat anteriorly.

Quadrates.—There are no special characters associated with these bones.

In the development of the skull the maximum breadth across the quadratojugals is always less than half the length from the tip of the snout to the supraoccipital, as may be seen from the following figures :—

	Total length of specimens.	Cranial length.	Cranial breadth.
J. 4279 Juvenile	295	47	22
J. 4283 Juvenile	740	127	52
J. 4280 Skull only	..	262	105
J. 2788 Skin and Skull	2,343	375	165
J. 4286 Skull only, aged ..	..	398	198

The development of the slender snout and the change in contours with age may be shown by comparing the length, taken from the tip of the premaxillaries to the anterior border of the orbits, with the maximum breadth of the maxillaries taken below this orbital border.

	Pre-orbital length.	Breadth of Maxillæ.
J. 4279	24	14
J. 4283	82	31
J. 4280	194	64
J. 2788	280	102
J. 4286	285	129

It will be seen that the juvenile specimen (*J. 4279*) is relatively short-snouted; that in the medium-sized skull the length of the snout may be thrice the breadth of the maxillaries at this point; and that the aged skulls are again less slender. The variability of the snout is illustrated by the proportions of the two large skulls, *J. 2788* and *4286*, the latter being relatively much broader at the orbits.

Palatal Surface.—The anterior portion of the premaxillaries is very irregular owing to the perforations for the accommodation of the two anterior mandibular teeth and the sloping cavities behind. The premaxillary foramen is an irregular triangular cavity, about as large as an alveolus of an average tooth, behind which the conjoined elements have a suture which is at least four times as long as that in front of the foramen. The suture between the premaxillæ and maxillæ passes obliquely backward from the centre of the large notches, but only extends to the second maxillary tooth at the median junction.

The maxillaries form the greater part of the palate. From the posterior end at a point nearly opposite from the pterygoid-palatine suture, the dental arcade converges markedly to the region of the seventh maxillary teeth, but from thence forward the snout becomes very gradually more slender until the enlarged notches are reached. The proportions of the palate vary so much with age that no exact ratios can be applied to both juvenile and aged skulls, but the central breadth of the conjoined elements is contained at least thrice in the maximum length, and may be five times. In antero-posterior profile the maxillæ are decidedly convex, but in one skull, probably as the result of injury, the anterior region is very concave. In transverse section the palate is fairly flat, but the alveolar borders are irregularly raised. The median line is marked by ridges in the anterior region and there may be a depression posteriorly. A lengthy suture is formed with the anterior process of the palatines and a much shorter one marks the lateral extension of each palatine to the front edge of the fenestra.

The palatines contribute about one-third of the total length of the bony palate. The breadth is equal to the maximum transverse diameter of the adjoining fenestra, and in the smaller crania this area is very flat in transverse section, but in the large skull the lateral borders are broadly rounded. In antero-posterior profile these bones are concave. The anterior processes are elongate and acuminate, and are almost as long as the main portion. The lateral portions of the suture with the pterygoids are curved backwards.

The greater part of each palatine fenestra is contained within the area of the dental arcade, and, except in aged skulls, the breadth is contained at least three times in the length. The fenestræ extend as far forward as the anterior borders of the eleventh maxillary teeth.

Pterygoids.—The palatal plates of the pterygoids are concave, both transversely and in antero-posterior direction. The maximum length of each element is greater than the breadth and is equal to that of the palatine without its anterior processes. They contribute the posterior border to the palatine fenestræ. The internal narial aperture is large and sub-quadrangular and opens downwards and backwards. Its posterior border, which is divided by a prominent median wedge, forms the termination of the bony palate below the opening of the median Eustachian canal.[1] The inferior portion of the median ridge of the vertically placed basioccipital is seen in this aspect.

Basisphenoid.—The basisphenoid may not appear in this region, although it is sometimes represented by an attenuated wedge. We may thus have *the pterygoids actually articulating with the basioccipital on the surface,* although separated above.

The transpalatines or ectopterygoids have a longer contact with the maxillaries than with the jugals or with the pterygoid plates. These bones present no special characteristics.

Dentition.—Although the usual number of teeth in the upper jaw is nineteen on each side, with fifteen in the lower, there may be as many as twenty-one above and seventeen below.

There are the usual five teeth in each premaxillary, the fourth being the largest and the third only slightly less. The first is set near the median line and is closely paired with its fellow. After a space the second and third are set close together and an interval separates the fourth and fifth. The teeth in the maxillary vary from fourteen to sixteen. The fifth tends to be the most robust of the series, and this is slightly larger than the fourth mandibular. The posterior teeth in both jaws are considerably stouter and somewhat shorter than the anterior. The apices of the first seven teeth are accommodated in lateral notches in the mandible.

The first pair of mandibular teeth perforate the premaxillaries and their apices may be seen on the upper surface of the snout. The fourth tooth is raised somewhat above its fellows. There may be as many as seventeen in the series, and the second to the tenth, inclusive, are accommodated in notches in the maxillaries when the jaws are closed. The posterior teeth range inside the maxillary series.

Two of our specimens have twenty-one upper and two (including *J. 4279*, juvenile) have twenty, whilst four of the mandibles have more than fifteen teeth.

Double Teeth.—A remarkable feature is the appearance in several specimens of double-functioning teeth in either the maxillaries or the mandible

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[1] Owen, Phil. Trans. Roy. Soc., 1850, p. 521.

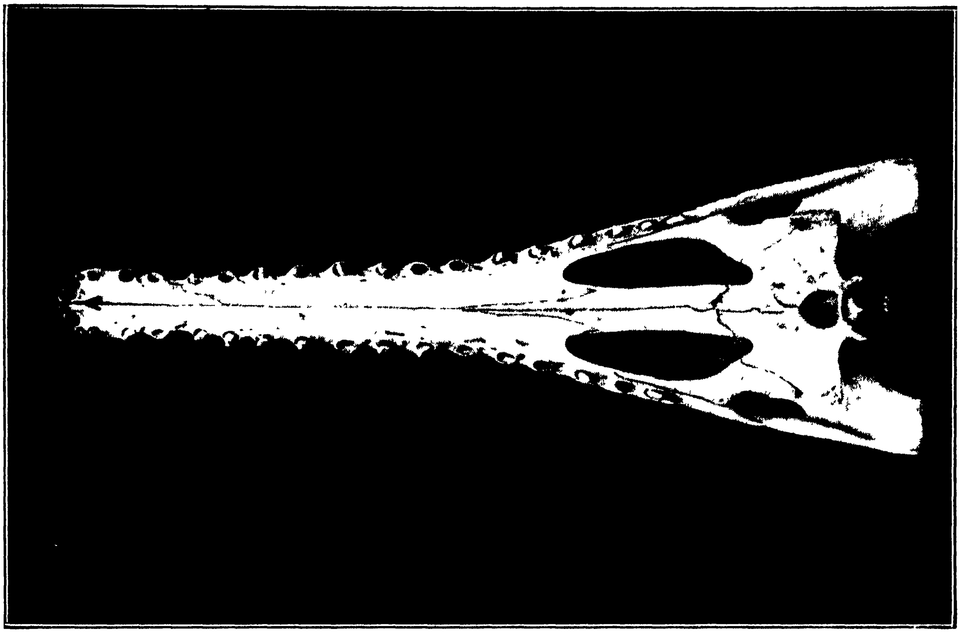

Fig. 1.—*Crocodilus johnsoni*. Palatal surface of cranium. J. 4280.

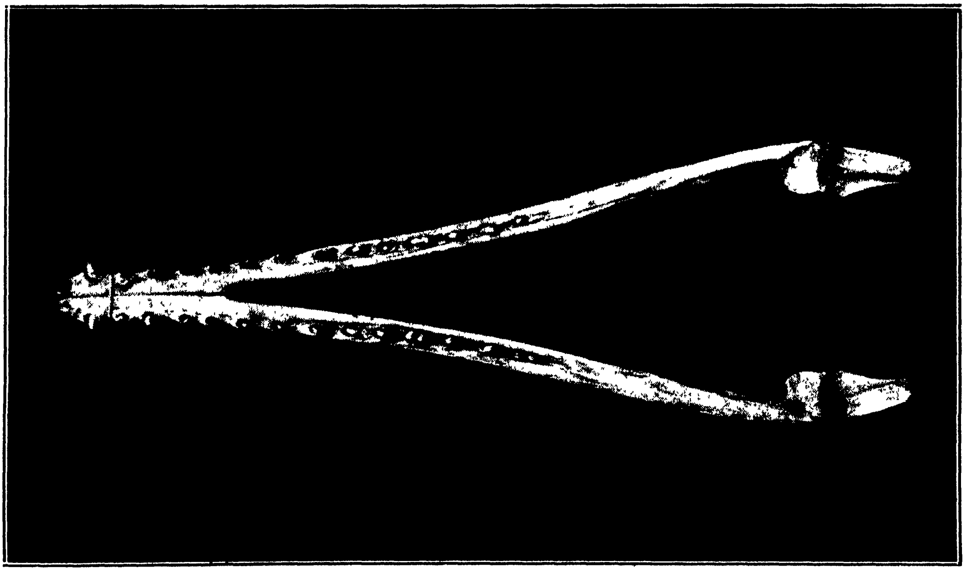

Fig. 2.—*Crocodilus johnsoni*. Mandible of cranium. J. 4280.

on one or both sides. These double teeth are mostly of equal size, set close together antero-posteriorly in a compound alveolus, and they are the twelfth and thirteenth of both upper and lower series. Two pairs of these teeth may be seen in Plate XXIV., Figure 2.

In the youngest specimen there are six teeth beneath the orbits, whilst in the aged skull only one and a moiety of a second come within this region. This change during development has been recorded for other species by Mook.

Mandible.—The symphysis extends to between the sixth and seventh teeth. The splenial approaches but does not enter the symphysis. No other special characters of the mandible have been noted.

Dermal Armour.—In *Crocodilus johnsoni* there is a postoccipital series of four oval keeled scutes arranged transversely, as in *C. palustris*, figured by Gadow.[2] The middle pair are usually the larger, and are separated on the median line. The outer pair are in juxtaposition with the middle pair, one on each side, and their lateral borders are oblique. This series is separated from the nuchal scutes by a greater interval than it is from the occipital.

The nuchal series is actually an anterior phalanx of the dorsal, being almost continuous with them. The anterior pair of the series is the largest, and this is followed by a slightly smaller pair. On the emarginated lateral borders of these four scutes are a still smaller pair, one in juxtaposition on each side. These six keeled scutes are narrowly separated from two consecutive pairs which are in turn followed by a series of four transverse scutes. The regular dorsal series of six begins behind these, and in the mid-dorsal region there may be several rows with eight large bluntly keeled scutes, but the lateral members are somewhat irregularly placed. In antero-posterior direction these scutes slightly overlap, the front edge of one series being bevelled to fit under the posterior edge of the preceding series. Medio-dorsally the majority of the scutes are articulated by sutures.

From the first row of four transverse scutes to the region above the cloacal slit there are eighteen series, the scutes being reduced to transverse series of four between the hind limbs. The caudal scales are in thirty-eight series, and the bifurcation of the usual vertical fringe commences at about half the length.

Other Characters.—In the juvenile specimen the length of the tail slightly exceeds that of the head and body, but in adult specimens the caudal portion is distinctly shorter. The fore limbs are smaller than the posterior ones, which carry a serrated fringe on the outward edge. There is no sign of webbing between the digits of the fore limbs, but the two outer digits of the hind feet are extensively webbed, the membrane being carried to near the tip of the clawless member. In the juvenile specimen the ear opening, when exposed from the overlying flap, is slightly smaller than the eye.

Habits.—Several observers, including F. W. Hann, note that this crocodile is harmless and feeds principally on fish. Lucas and Le Souef say that "residents will swim without fear in pools in company with the saurians."

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[2] Gadow, Amphibia and Reptiles, Camb. Nat. Hist., 1909, p. 455.

In Jeannie Gunn's interesting book, "The Little Black Princess," a lubra states that the sea-going crocodiles were "cheeky fellow" and would "round you up," but the crocodiles in the land-locked pools were "frightened fellow" and it was always safe to take their eggs.

Rostral Plasticity.—Gadow has pointed out that since Jurassic times there have been two parallel lines of development in the Crocodilia, instancing the long-snouted *Tomistoma* and *Gavialis* and the more broad and short-snouted members like the rest of the Crocodiles and Alligators (loc. cit., p. 435), but that there exist many intermediate forms. It is obvious that some species of *Crocodilus* have developed an almost gavial-like snout, evidently in association with certain food habits. The remarkable plasticity of the cranial rostrum was noted by the writer when dealing with the Queensland Ichthyosaur,[3] and interesting parallels could be made between the tendency to an elongated snout in such diverse groups as the Ichthyosauria, Eusuchia, and Cetacea. The architecture of the posterior region of the skull has been studied by several authorities (E. C. Case, W. K. Gregory, etc.), who have partly explained the structure of certain elements as largely conditioned by stresses induced by muscles, but it is of interest to note that the varying contours of the rostrum are scarcely to be associated with muscular action. Rostral elongation is probably an inherited tendency, dominant in certain species, that originally developed in response to the stimuli of special food environments, partly checked or increased by selection.

Generic Status.—The seven species of *Metriorhynchus* figured by C. W. Andrews[4] afford a striking instance of plasticity in crocodilian species from the Oolite. This variation in rostral contours has to be borne in mind when dealing with the Crocodiles of to-day. Although it seems anomalous to keep within the same genus such diverse forms as *Crocodilus johnsoni*, *porosus*, and *robustus*, to say nothing of broad-snouted fossil species of the *robustus* and *sivalensis* type, the difficulties of making sub-generic distinctions are considerable. The writer has therefore preferred not to use Gray's genus "Philas" in the present paper. The slender-snouted species of *Crocodilus*, such as the Australian *johnsoni*, the West African *cataphractus*, and the South American *intermedius*, probably represent a parallel development rather than a closely related series requiring a distinctive name within the genus. They may thus be interpreted as illustrating Convergence.

Affinities.—*C. johnsoni*, although resembling *C. cataphractus* in general outlines, differs prominently in certain features such as the mandibular symphysis, the course of the premaxillo-maxillary suture, and the relative proportions of the elements forming the bony palate. It similarly differs from the African species, and it is most unlikely that its special characters have been derived from either of the others. This slender-snouted crocodile of the fresh-waters of Northern Australia has probably evolved within its own region from the more generalised crocodiles that were common in the past.

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[3] Longman, Mem. Qld. Mus., vol. vii., 1922, p. 255.

[4] C. W. Andrews, Cat. Mar. Rept. Oxford Clay, pt. 2, 1913, Text-figure 73.

A CROCODILIAN FOSSIL FROM LANSDOWNE STATION.

By Heber A. Longman, Director, Queensland Museum.

(Plates XXV–XXVI, Figure 1.)

During the course of excavating a large "tank" at Lansdowne Station, near Tambo, South-Central Queensland, in June, 1924, Messrs. Brace Brothers, contractors, discovered fossil remains to which some prominence was given in the Press. Mr. J. Armstrong, then manager of Lansdowne, kindly informed me that these were exposed by heavy plough and scoop work and extended over an area of about 40 ft., being embedded in clay overlying soft sandstone. As a result of correspondence, these remains were forwarded by Mr. F. Jack Brace, who generously donated them, on behalf of Messrs. Brace Brothers, to the Queensland Museum.

The great majority of the fossil fragments consisted of bones of two gigantic extinct kangaroos. Unfortunately no one of these bones, except a sacrum, is complete, but the fragments agree with material from the Darling Downs recognised here as *Palorchestes azael* and *Macropus anak.*

The most important specimen is the major portion of a large cranium, which is evidently conspecific with the extinct crocodilian from the Darling Downs described by De Vis as *Pallimnarchus pollens.*[1]

Locality.—From information kindly supplied by Mr. L. E. Ball, B.E., Government Geologist, I am able to record the actual location of the tank, which is in the south-western part of portion 5 of parish of Metowra, about seven miles south-west of Metowra (Lansdowne) homestead, and about three miles west of the Ward River.

Mr. Ball, who saw the fossils at Tambo in December last, was informed that the majority of the bones were found within six feet of the surface, but that the cranium itself was unearthed at a depth of twelve feet.

Matrix.—The matrix in which the cranium was forwarded may be defined as a slightly ferruginous, calcareous, pebbly silt, containing clay ironstone concretions. In this the cranium was lying with the palatal surfaces exposed. In the cavities several pebbles were found and the majority of these, with those in the matrix, were somewhat rounded. Small quantities of a very fine-grained, slightly ferruginous sandstone were present, and it seems probable that the underlying material mainly consisted of this.

The occurrence of the marsupial remains and this extinct crocodile so far to the north-west of the Darling Downs area is of special interest.

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[1] De Vis, Proc. Roy. Soc. Qld., Vol. II, pp. 181-191, Plates X-XIV, 1886.

Mr. Ball informs me that the marine series was considered to extend southward across the Lansdowne country. These fossils are, however, a record of relatively recent freshwater deposits far within the borders of our extensive Cretaceous formation. Possibly these deposits at Lansdowne represent a filled-in valley, or an earlier course of the Ward River, formed in late Tertiary times in the uplifted floor of our vast Cretaceous sea.

As the cranium is the first fairly complete specimen to be received of this extinct crocodilian, additional interest is attached to the Lansdowne fossils.

PALLIMNARCHUS POLLENS De Vis.

Unfortunately the cranium was received in a fractured condition, the deposit not being suitable for good preservation. On exposure to the air the palatal and superior cranial surfaces were found to be very crumbly, and it was necessary to impregnate the whole cranium with an adhesive solution. In this process some of the sutures were perhaps made more obscure.

The cranium is complete to the posterior border of the frontal, with a length of 485 mm., and on the left-hand side a portion of the postfrontal (postorbital) is preserved. The superior surface is somewhat depressed in the posterior region of the nasals owing to pressure and partial fracture during fossilisation.

The specimen is of the brevirostrine type, and but for the presence of large premaxillo-maxillary notches it would be almost caimanoid in superior view. The external narial aperture is circular and is not divided by processes from the nasals. The sculpturing is moderate throughout the superior surface, but is deepest in the region between the anterior borders of the orbits. There are no longitudinal ridges as in *C. porosus*, and although the inner borders of the orbits are raised and thickened they are not prominently ridged.

In the plane of the superior surface of the cranium there is a decided concavity behind the premaxillaries, and as may be seen from Plate XXV, Fig. 2, the sides of the maxillaries are very prominently festooned.

Dentition.—As only one functioning tooth is complete *in situ*, the dentition is principally described from alveolar remains. Each premaxillary contains five teeth. The two anterior are relatively small and are set near to the border; then follow two enlarged teeth, those on the right side attaining 25 mm. at the alveolar border; behind these, in the inward curve of the large notch, is a smaller tooth. Close to the median line and immediately behind the two anterior teeth is a deep recess for the accommodation of the anterior mandibular tooth.

Each maxillary contains fourteen teeth. The fourth is predominantly enlarged, attaining a diameter at the base of 30 mm.; this tooth marks the maximum of the descending festoon behind the notch. The three anterior teeth are subequal, and the three teeth subsequent to the enlarged fourth are smaller than the average; the tenth and eleventh are slightly larger than the average in the remainder of the series.

The dental arcade terminates in front of the orbits,[2] and this characteristic, as pointed out by Mook,[2] is a sign of maturity.

Detached Teeth.—Fragments representing a dozen teeth were forwarded with the cranium. These exhibit great variation, as is usual with crocodilians, and range from a large conical "canine," with a diameter of 27 mm., to small teeth only 9 mm. A single complete tooth is cylindrical, with a length of 60 mm. (enamel portion 15) and a diameter of 17 mm. Several of the fragments are laterally compressed, with prominent anterior and posterior carinæ. The enamel surface is minutely rugose.

Palatal Surface.—Owing to the badly fractured condition of the bones forming the palate, the exact course of the sutures between the premaxillaries and the maxillaries cannot be satisfactorily traced; the suture apparently crosses the palate in a fairly straight line about 55 mm. behind the premaxillary foramen, this being approximately in the central line of the notches. Similar difficulties prevent a definite record of the suture between the palatine and maxillary elements, but from the antero-internal border of the palatine fenestræ it apparently goes forward obliquely to a point opposite the eighth maxillary tooth and then crosses to the median suture in a nearly straight line. The posterior region of the palatines is too much broken up to yield definite evidence.

Fenestræ.—The palatine fenestræ are large sub-oval vacuities, attaining at least 70 mm. in maximum breadth, this being nearly opposite the penultimate tooth. As in *C. porosus*, more than half of the lateral borders of these fenestræ are composed of the transpalatines or ectopterygoids, but as the posterior margins are incomplete these proportions cannot be more accurately stated.

The premaxillary foramen is much wider than long, and sufficient of its anterior edge is preserved to show that it is transversely oval, the dimensions being approximately 30 by 15 mm. Owing to the supporting plasticine, this foramen is partly obscured in Plate XXVI, Fig. 1.

Superior Surface.—The premaxillaries are broad and symmetrically convex bones and they extend well beyond the external narial aperture. Their maximum diameter is 165 mm., which is about two-fifths greater than their minimum length. The premaxillo-maxillary suture curves backward from the notch on each side until it reaches the mid-region of each element; then it curves forward to meet the nasals about 20 mm. from the external nares. This, as noticed by De Vis (*loc. cit.*) is an unusual characteristic in crocodilians, the premaxillaries in most species having prolonged posterior processes adjoining the nasals. Two premaxillary fragments from Darling Downs deposits have been partly utilised in tracing these sutures.

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[2] C. C. Mook, Bull. Amer. Mus. Nat. Hist., XLIV, 1921, p. 61.

The external narial aperture is sub-circular in form, with a length of 59 mm. and a breadth of 52 mm.

The nasals are 255 mm. in length and attain a breadth of 52 mm. They reach, but do not penetrate, the external narial aperture (which has no bony septum), and in this region they are very narrow. The course of the sutures is somewhat obscure in places, but it is evident that the nasals rapidly widen and that for about two-thirds of their length they are at least 50 mm. wide. Posteriorly they terminate in acuminate processes which meet the frontal wedge.

The frontal is imperfect posteriorly, but the bone is at least 110 mm. in length. The anterior process is abruptly acuminate, 55 mm. in length, and terminates 15 mm. in front of the orbits. The interorbital region is very concave, being 17 mm. below the plane of the ridges in the mid-region. The minimum interorbital diameter is 66 mm. Unfortunately the sutures between the prefrontals and lacrymals and between the lastnamed and the jugals cannot be satisfactorily traced, but there appear to be no special characteristics.

The orbits are very incomplete posteriorly; their maximum breadth is less than the interorbital diameter.

Original Type Material.—In his description of *Pallimnarchus pollens* De Vis used material from at least four specimens, and his associated registered material included fragments now recognised as belonging to *Crocodilus Nathani* (*loc. cit.*). The fragments from the frontal region described and figured by De Vis (Plate XIV, Fig. 2), in which the interorbital space is quite flat, evidently represent a species as yet unknown and for the elucidation of which more material is necessary. The left premaxillary described by De Vis is almost identical in general dimensions with the Lansdowne cranium.

The salient feature of the mandibular elements, which formed the principal part of De Vis' material, is the very broad symphysis, which terminates opposite the posterior border of the fifth tooth.

De Vis also stressed the significance of the flat, bevelled anterior edge of the associated body scutes, following Huxley's observations (Proc. Linn. Soc. Lond., IV, 1860, p. 21), as characteristic of the Alligatoridæ rather than of the Crocodilidæ.

Affinities.—The general contours of the cranium, the dentition, the presence of large premaxillo-maxillary notches, and the absence of a bony nasal septum are characters that suggest affinities with the genera *Crocodilus* and *Diplocynodon*.

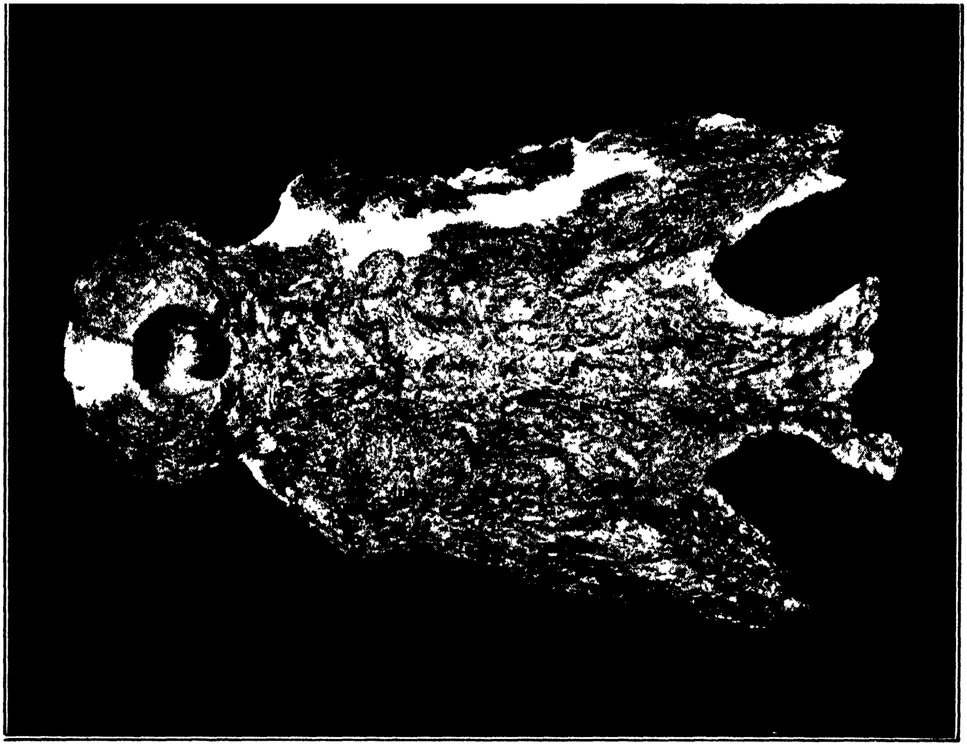

Fig. 1.—*Pallimnarchus pollens*. Superior view of Lansdowne cranium. One-fourth natural size.

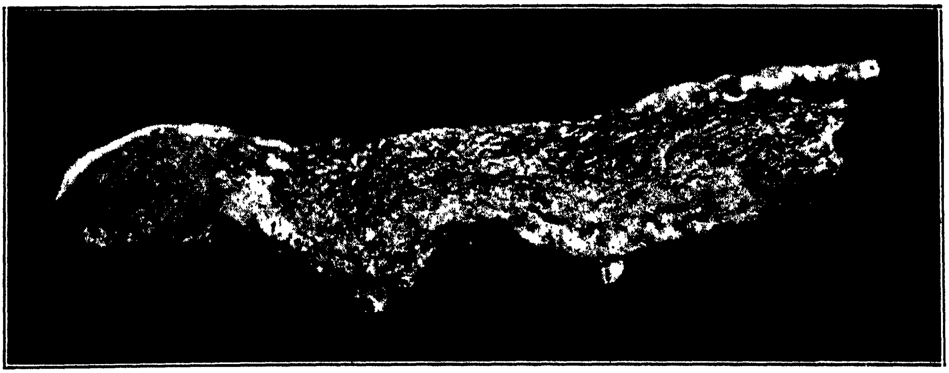

Fig. 2.—*Pallimnarchus pollens*. Lateral view of Lansdowne cranium.

The contours of the palate somewhat resemble those of Owen's *Crocodilus hastingsæ,*[3] referred by Lydekker[4] to *Diplocynodon hantoninesis* Wood, from the London Clay. The premaxillary foramen, however, is transversely oval, and the interfenestral table or palatine area is wider. The width of the cranium at the termination of the dental arcade is equal to the distance from the anterior of the rostrum to the palatine fenestræ. The maximum width of the premaxillaries is considerably more than half of the distance from the rostral tip to the fenestræ. In these proportions the Lansdowne fossil agrees better with *Crocodilus sivalensis,* figured by Falconer[5] as *C. bombifrons,* but the cranium as a whole is relatively broader, and the external narial opening is by no means so large. The fossil has also been compared with *C. robustus,* from Madagascar, as described and figured by Charles C. Mook,[6] but from that species it is widely separated by the absence of ridges, the dominance of the fourth maxillary tooth, the very prominent festooning, etc.

The marked distinctions between the mandibular elements of *Pallimnarchus pollens* and *Crocodilus Nathani*[7] may be supplemented by comparisons with the type material of the last-named with the Lansdowne cranium. The frontal fragment of *C. Nathani* is less concave in the orbital region, is much narrower and less thick, whilst the sculpturing is very distinct; the frontal has a far greater share in the orbital borders, the inner contours of which are more circular.

As there is no special enlargement of the third mandibular tooth, *Pallimnarchus pollens* cannot be placed in the genus *Diplocynodon* as defined by Pomel and re-stated by Lydekker.[8]

In 1889 Boulenger[9] pointed out the difficulty of making subgeneric divisions of living species of *Crocodilus,* and when fossil specimens are considered the problem is still more complex. Mook, as the result of his special studies, says: "This genus, which is variable in form at the present time, and appears to have been in the past, is evidently near the central line from which most of the existing Crocodilians have sprung." *Pallimnarchus pollens* is doubtfully distinct from *Crocodilus* in the broad sense. It differs from several species with which it has been compared in a complex of characters rather than in one outstanding feature. The evidence of the dermal armour, as outlined by De Vis, has also to be considered. For the present it seems best to retain the generic name, tentatively given by De Vis, for this Queensland fossil, although it is undoubtedly allied somewhat closely to some of the broader-snouted species of crocodile. It is unfortunate that no significant remains of the occipital and parietal segments are as yet available.

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[3] Owen, Mon. Fos. Rept. Crocodilia, 1850, Pl. VII.

[4] Lydekker, Brit. Mus. Catal. Foss. Rept., 1, 1888, p. 45.

[5] Falconer, Pal. Mem., 1, 1868, Pl. 28.

[6] C. C. Mook, Bull. Amer. Mus. Nat. Hist., XLIV., 1921, Pl. IV.

[7] Longman, Mem. Qld. Mus., VII, Pt. 1, 1924, p. 23, Pl. III.

[8] Lydekker, Geol. Mag., dec. III., Vol. IV., 1887, p. 308.

[9] Boulenger, Brit. Mus. Catal. Chel, etc., 1889, p. 277.

It has been pointed out that the presence of a premaxillo-maxillary notch is not an invariable diagnostic character between the crocodiles and the alligators, and there is a slight concavity in this region in *Jacare sclerops*, as figured by Mook, and in the fossil species, *Alligator lutescens*, described by Roverto from the Argentine.[10] But the very prominent notches in the Lansdowne fossil form one of the distinctive features separating *Pallimnarchus pollens* from the caimanoid group, with which De Vis was inclined to associate it. He also overlooked the fact that the "Alligatoridæ" is represented in China. Although recognised as a distinct family by Huxley, Zittel, and others, most modern writers have included alligators and caimans within the Crocodilidæ.

In his study of Central American Crocodiles, K. P. Schmidt[11] says: "The existence of broad-snouted crocodiles, for the most part small species, in Central America and Cuba, India (*C. palustris*), and Central Africa (especially *Osteoblepharon osborni*), strongly suggests a case of the radiating dispersal from a northern center in accordance with Matthew's general theory of dispersal."

This view seems to fit the facts of the case, and the crocodiles thus form another link in the evidence connoting a northern origin for our Reptilia, as noted by the writer in a previous paper.[12]

Total Length.—It has been found in an average specimen of the present-day *Crocodilus porosus* that an inch of mandibular tooth-space roughly corresponds to a foot of body-length. Taking this ratio as an approximate guide, the Lansdowne crocodile would have been about 14 ft. in length. Obviously this ratio does not apply to the slender-snouted Crocodilians.

Other Fragments.—A much-abraded vertebra of the usual procœlian type from the dorsal series and a few shattered mandibular and other fragments were also received with the cranium, but these are too incomplete to yield useful evidence.

Among the remains of scutes, no one of which is complete, is a specimen with the bevelled anterior edge of the type noted by De Vis.

Fragments of a mandible, separate teeth, and scutes from the Warburton River, South Australia, were placed on record by the late R. Etheridge, junr., and these were identified by De Vis as *Pallimnarchus pollens*.[13]

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[10] C. Roverto, Anal. Mus. Nac. Buenos Aires, XXII., 1912, p. 346.

[11] K. P. Schmidt, Field Mus. Nat. Hist., Zool. Ser., XII., 1924, p. 84.

[12] Longman, Mem. Qld. Mus., VIII., Pt. 1,, 1924, p. 10.

[13] R. Etheridge, Ann. Rep. Govt. Geol. South Aus., 1894, p. 20.

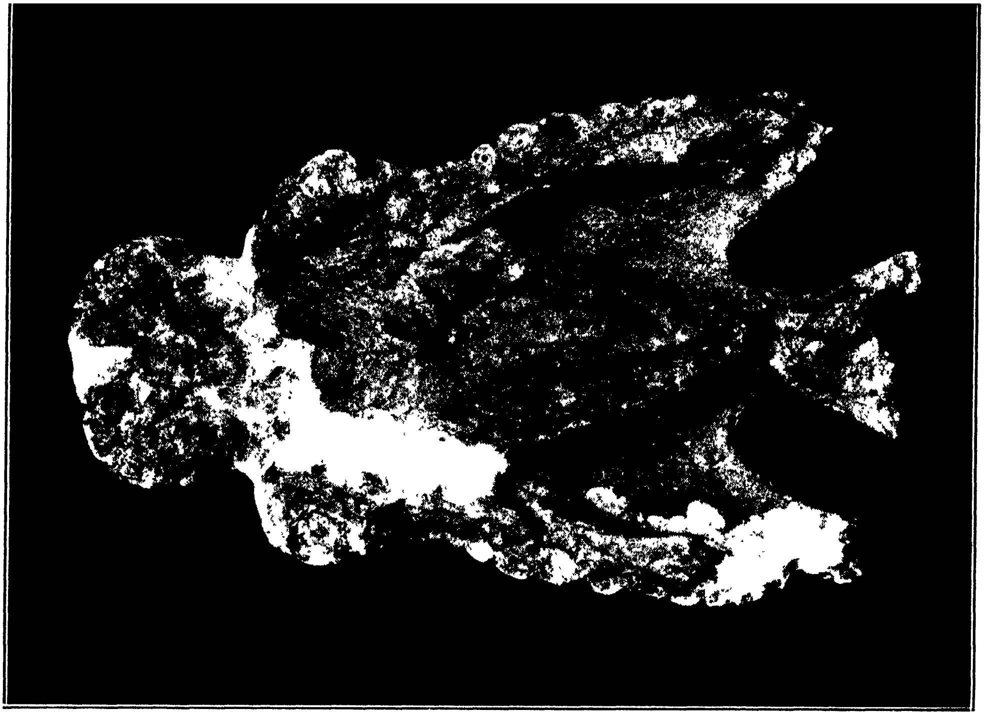

Fig. 1.—*Palliminarchus pollens.* Palatal view of Lansdowne cranium.

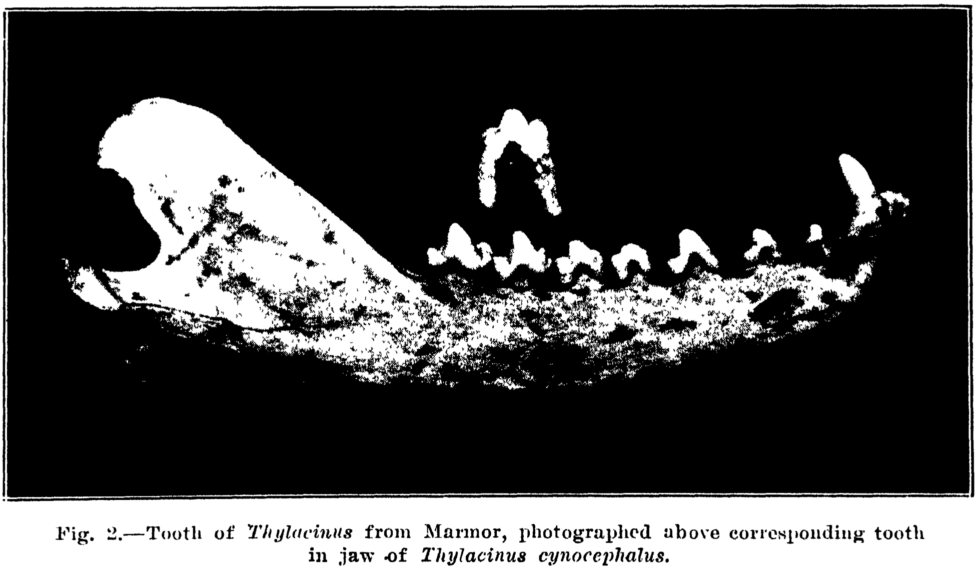

Fig. 2.—Tooth of *Thylacinus* from Marmor, photographed above corresponding tooth in jaw of *Thylacinus cynocephalus.*

FOSSIL MARSUPIALS FROM MARMOR.

By Heber A. Longman (Director).

(Plate XXVI, Figure 2.)

In a former issue of this publication[1] I placed on record a number of fossil marsupial specimens from the extensive deposits of cave-earth exposed at the limestone quarry at Marmor, North Coast Line, Queensland, which had been forwarded through the kindly interest of the local manager, Mr. Samuel Evans. The list included *Diprotodon australis*, *Phascolomys* sp., *Macropus* sp., *Thylacoleo carnifex* and *Trichosurus* sp. Additional material has been received from time to time, and although the specimens are very fragmentary, mostly being bone breccia cemented in cave-earth, evidence is now available for other records.

Sarcophilus laniarius Owen (*F. 1693*).—This large Polyprotodont is represented by a portion of a left maxilla with the last premolar and two anterior true molars, with other isolated molar fragments and a canine. The maxilla is still partly embedded in matrix. This was exhibited at the October meeting of the Royal Society of Queensland,[2] and it is of interest to recall that a still smaller fragment (*F. 1373*), consisting of part of a mandible with a single molar, from the Mount Etna Fertiliser Company deposits, near Rockhampton, was placed on record by the writer in 1921.[3] This material from Marmor and Mount Etna represents a species closely allied to, if not identical with, *Sarcophilus laniarius* from the Darling Downs, but although more complete specimens may afford data for a distinctive name, it would be unsatisfactory to give one at present.

Thylacinus spelœus Owen.—An incomplete conical crown, received from Mr. Evans with the *Sarcophilus* specimens, could not be placed except with the premolars of the extinct Queensland representative of the marsupial wolf, but this dental fragment seemed a somewhat inadequate basis for a record. However, in March last a complete, isolated molar tooth was received, and this proved to be the third true molar from the right hand side of the mandible. This tooth (*F. 1737*) is illustrated on Plate XXVI., Figure 2, and in order to show its large size in comparison with its present-day Tasmanian representative it is placed immediately above the corresponding tooth in *Thylacinus cynocephalus*. The tooth is slightly incomplete on its anterior face, but its maximum antero-posterior length, above the alveolar portion, is 17 mm. The maximum breadth is 8·5 mm. In these marsupial carnivores there is considerable variation in the dentition of the sexes, and it is thus probable that the Marmor tooth comes within the range of male specimens of Owen's species. In describing *Thylacinus rostralis* from the Darling Downs,[4] De Vis emphasized the relatively longer muzzle, as shown by the greater antero-posterior extent of the dental arcade anterior to the true molars.

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[1] Longman, Mem. Qld. Mus., VIII., Pt. 1, 1924, p. 21.

[2] Abs. Proc. Roy. Soc. Qld., XXXVI., p. XVII.

[3] Abs. Proc. Roy. Soc. Qld., XXXIII., p. XIV.

Phascogale flavipes Waterhouse.—A fragment (*F. 1738*) of the left ramus of a mandible, containing the last three molars and the alveoli of the first and of a premolar, agrees most nearly with the northern sub-species of this "pouched mouse," described by Oldfield Thomas as *Phascogale flavipes adusta*.[5]

Petrogale cf. *inornata* Gould.—This is based on a specimen with four true molars in position in a fragment of the left ramis of a mandible (*F. 1739*). The maximum length of the molar series is 24 mm. The ridges of the last tooth show but slight signs of wear, but the mandible is rather more robust than that in present-day rock wallabies as represented in our collection. There is considerable variation in this region, however, and this character, in the degree presented, is not of specific value.

Acknowledgments.—It is my pleasant duty to thank Mr. A. A. Boyd, manager of the Mount Morgan Gold Mining Coy., and especially the local manager at the Marmor Quarry, Mr. Samuel Evans, for reserving and presenting this interesting material.

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[4] De Vis, Proc. Linn. Soc. N.S.W., VIII. (2), 1893, p. 444.

[5] O. Thomas, Ann. Mag. Nat. Hist. (9), XI., 1923, p. 175.

OPHIDIAN VERTEBRÆ FROM CAVE DEPOSITS AT MARMOR QUARRY.

By Heber A. Longman, Director.

In October, 1924, in company with Mr. Samuel Evans, manager, and Mr. W. Goulding, engineer, I had an opportunity of examining several pockets of cave earth at the Marmor Quarry, N. C. Line, Queensland. Owing to extensive excavations, this cave earth is now exposed, although at a depth of about 60 feet from the original surface of the limestone hill.

Whilst working through one of these pockets four procœlian vertebræ with hemispheroid cups and balls of the ophidian type were unearthed. Three of these were from the pre-anal series, and one, as shown by the paired articular facets for the hypapophyses, is from the caudal series. Judging from the slight development of the hypapophyses, no one of the three pre-anals is from the anterior region of the body. Unfortunately these specimens are all imperfect, but the contours are sufficiently preserved to demonstrate their close affinity with *Python variegatus*, the common carpet snake of to-day.

In the largest specimen the maximum diameter at extremities of the anterior zygapophyses is 14 mm. The maximum height is 10 mm., but the neural spine is very incomplete. The diameter of the cup is 4·5 mm. The zygapophyseal facets are strongly developed as in the Pythons, and do not terminate in supplementary lateral processes. The zygosphene is relatively stout. Two vascular foramina are present in the recesses of the zygantrum. The contours of the centra and of the zygapophyses are closely comparable with those of a carpet snake about 6 feet in length. The articular diapophyses are convex oval surfaces extending from the ventral border of the cup to the lower border of the anterior zygapophyses. *Reg. No. F.* 1733.

Thanks to the researches of Owen, E. D. Cope, de Rochebrune, O. C. Marsh, R. Lydekker, and other writers there is considerable literature on the status of ophidian remains, and it is evident that well-preserved vertebræ may show diagnostic characters. Vertebræ of Pythons have been recorded from the Pleistocene cave-deposits of India, whilst species of *Palæopython* (included in Owen's *Paleryx* by Lydekker) have been described from Tertiary deposits in France and England. Cope and Marsh have described Boidæ from America. Lydekker has recorded[1] six vertebræ from the Wellington Caves of New South Wales, which were compared with *Nardoa* and *Liasis*, but not generically determined. The presence of a prominent hæmal carina on these is a distinctive feature compared with the Marmor specimens.

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[1] Lydekker, Cat. Fos. Rept. Amph., B.M., Part 1, 1888, p. 256.

The discovery of remains of *Thylacoleo*, *Thylacinus*, and *Sarcophilus* in the same deposits at Marmor is an interesting point.

In order to institute comparisons with the five main groups of ophidians found in Australia to-day (eliminating the Typhlopidæ for obvious reasons), the characters of available vertebræ were studied. As this proved to be of some interest, the results are set out in the following table :—

Python.—Neural spines hatchet-shaped, produced posteriorly.

Anterior zygapophyses with no lateral processes beyond the flat articular surfaces.

Hypapophyses only prominent in anterior region, the great majority of the pre-anal series being reduced to rounded carinæ, the anterior portion of which is formed by the ventral edge of the cup rim.

Dendrophis.—Neural spines rectangular laminæ, being slightly emarginated.

Anterior zygapophyses produced beyond and slightly below the articulating surfaces as pointed lateral processes.

Hypapophyses prominent in anterior region, but they are less developed towards the mid-dorsal region where they appear only as rounded carinæ.

Boiga (*Dipsadomorphus*). -Neural spines rectangular, being very slightly emarginated.

Anterior zygapophyses produced beyond and slightly below the articulating surface as short, pointed lateral processes.

Hypapophyses prominent in anterior vertebræ but only present as rounded carinæ on main portion of pre-anal series.

Demansia and Pseudechis.—Neural spines emarginated anteriorly and posteriorly at centre of laminæ, the upper edges projecting.

Anterior zygapophyses produced beyond and slightly below the articulating surfaces as marked, pointed lateral processes.

Hypapophyses prominent as oblique processes throughout the body length; not reduced to rounded carinæ.

Distira.—Neural spines hatchet-shaped, upper edge produced posteriorly owing to emargination of laminæ.

Anterior zygapophyses produced beyond and slightly below the articulating surfaces as marked, pointed lateral processes.

Hypapophyses prominent as oblique processes on the anterior part of the body, less developed in the mid-dorsal region, and towards the anal region they subside into well-defined carinæ.

In the mid-dorsal vertebræ of the relatively large *Typhlops ligatus*, examined, the neural spines and hypapophyses are undeveloped. The prezygapophyses are accompanied by tubular lateral processes (diapophyses), which are readily detached from the ribs.

THE LIFE HISTORY OF *OLIARUS FELIS* KIRK (HOMOPTERA).

BY HENRY HACKER, F.E.S.

(Plates XXVII-XXVIII.)

As this is the first complete life-history record in the genus *Oliarus*, full details are given of the conditions under which the insects were found. It is probable that an examination of similar situations in other countries will disclose subterranean habits among many other species of these cosmopolitan insects.

The capture of one or two examples at my home first drew attention to them. Subsequently others were taken by "sweeping" in the garden, where they appeared to be limited to the lower end. This part consists of a black, sticky, alluvial soil, while just beyond is a fringe of mangrove trees and the banks of a tidal creek. The only vegetation on this low-lying strip is the salt-water couch grass, *Sporobolus virginicus* var. *minor* Bail., which forms a dense mat over the area, owing to its being fenced off from stock.

At the roots of this grass, *Oliarus felis* Kirk. were found in numbers. Blocks of soil were cut out, and were readily broken apart where cracks occurred, displaying a white fibrous substance on both faces. In these cracks, early in April, were various-sized nymphs, and adults of both sexes. The white material consists of the filamentous tufts which are rubbed off the terminal abdominal extremity of the nymphs while moving about in the crevices. The attachment of these white tufts is extremely weak; they may be seen becoming detached when colonies are exposed, and the nymphs are pushing among the rootlets, trying to find fresh hiding places. The nymphs are very sensitive to light, and when exposed their chief object is to find some small hole or rootlet into which they may push their heads. After attaining this object they will remain quiet although the rest of their bodies are exposed to strong light.

Besides their delicate sensitiveness to light, the disparity between the thousands of these insects inhabiting each acre of grass roots, and the comparatively small number seen above ground or obtained in the sweep net, indicates that they are truly subterranean in their habits.

During the spring tides the place is saturated with brackish water, and for short periods is actually submerged for an hour or two daily. Several adults were seen climbing up the grass stems to avoid the water. No nymphs appeared, although they were numerous at the time. After the water receded some were dug up and were found to be apparently dry. No doubt the waxy secretion which covers their bodies renders them waterproof.

Another examination of the couch grass was made at the end of April, and many clusters of eggs were present in the crevices, each covered with its small white wad; a few females were seen at this time, but no males. On 12th May about one hundred young nymphs were seen while breaking up two small blocks of turf, but only one egg-mass. Examination at different periods showed that, in November and April, adults of both sexes were plentiful; while at other times only nymphs were present.

Eggs.—Length ·56 mm.; breadth ·025 mm. Oval, subtranslucent, white. Microscopically the shell is quite smooth, and without any visible microphyle. They are not attached, but are loosely placed in clusters of forty to sixty in small cavities among the grass roots, under a circular wad-like mass of white filamentous material.

Nymphs.—Last instar, length 5·5 mm.; breadth 2·5 mm. The anal tuft when present adds another 3 or 4 mm. to the length; anterior and posterior extremities rounded, sides somewhat parallel; head small, pale brown, smooth in the middle, with two rows of sensory pits on each side; eyes moderately prominent; pronotum pale brown, anterior angles rounded and thickly studded with sensory pits; there is a longitudinal median white stripe running the length of the thorax and continuing in a fine line to the apex of abdomen; the pale-brown wing-pads each carry a short curved row of sensory pits; abdomen white, with a broad transverse pale-brown band on each segment; two sensory pits on the first, four on the second, and a transverse row on the third and fourth dorsal segments; ventral surface white. The young nymphs are entirely white.

Adults.—Female, length 4 mm., tegmen 5 mm. Vertex about as broad as long, a little broader at the base: lateral margins fork nearer the apex than the middle, forming a transverse convex carina; a short central carina at base of vertex which does not reach the transverse one; pronotum short dorsally, widening laterally, hind margin angularly emarginate; abdomen flattened; pygofer broader than long, the anal segment small, not so long as pygofer, about as long as broad, the styles small, not so long as pygofer; central portion of pygofer thickly studded with minute peg-like processes.

Paler than the male; clypeus, vertex, and sides of prothorax brownish black, keels and carinæ ochraceous; mesothorax dark brown, keels and a stripe on each side ferruginous; abdominal segments dark brown, apical borders and sides of each segment ochraceous; pygofer pale; tegmina hyaline, piliferous, veins yellowish, hairs and cross-veins brown. In fresh specimens the whole body is dusted with a pruinose material, making it appear greyish.

Male. ., length 3·5 mm., tegmen 4 mm. Tegmina, basal two-thirds hyaline, apical third fuscous.. The periandrium is produced into a flat process; three curved spines arise from near base of penis, which is membraneous. Differs from the female in the smaller size, darker markings, and the dusky apical third of tegmina. Mr. F. Muir, who kindly identified this species, states that the type material consists of three males.

EXPLANATION OF PLATES.

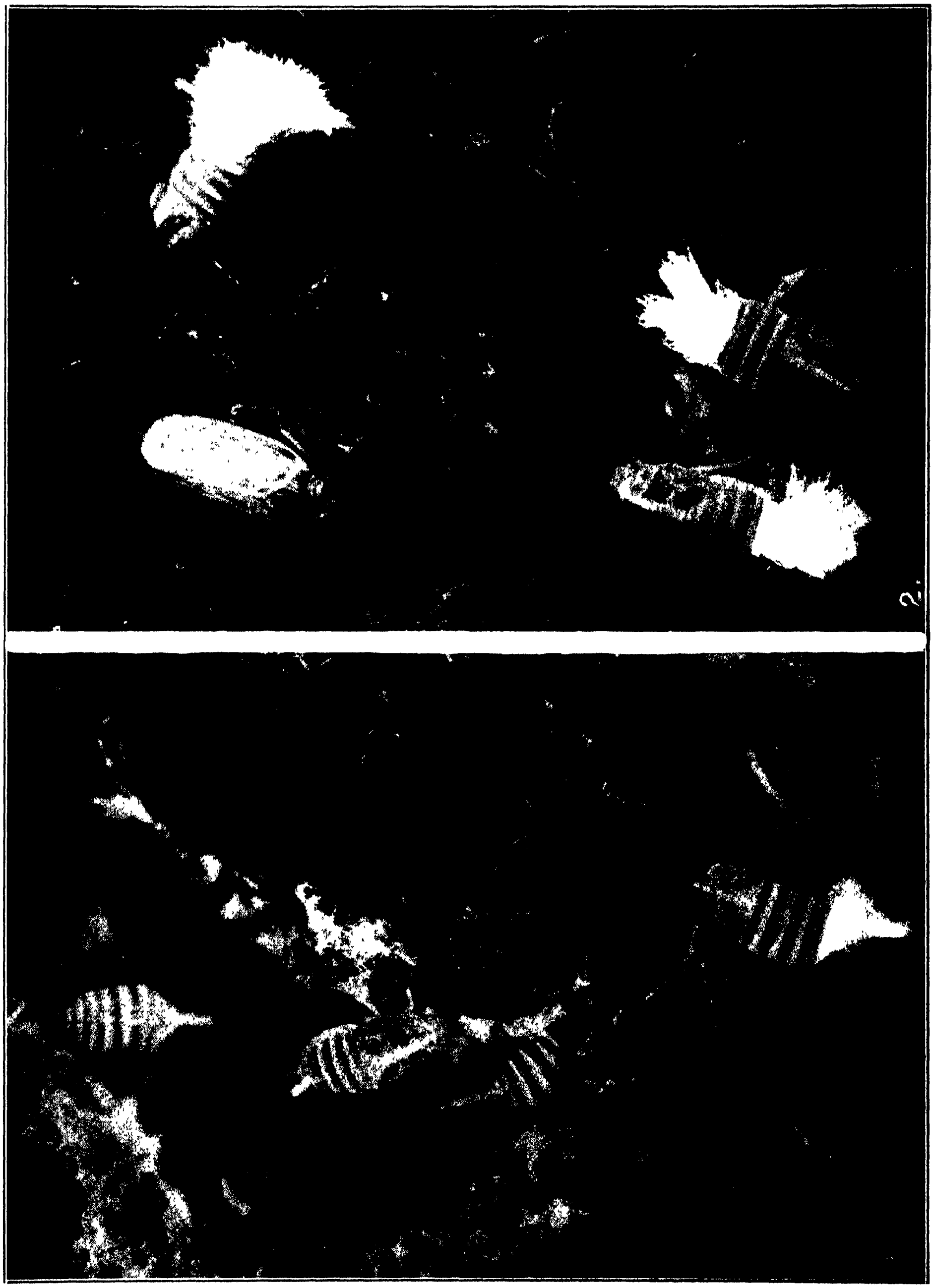
Plate XXVII, Fig. 1.—Sod broken along a crack, exposing four nymphs. × 5.

Plate XXVII, Fig. 2.—Sod broken along a crack, exposing three nymphs and an adult. × 5.

Plate XXVIII, Fig. 3.—Egg-patch with covering removed exposing the eggs. × 10½.

Plate XXVIII, Fig. 4.—Male genitalia, lateral view. × 54.

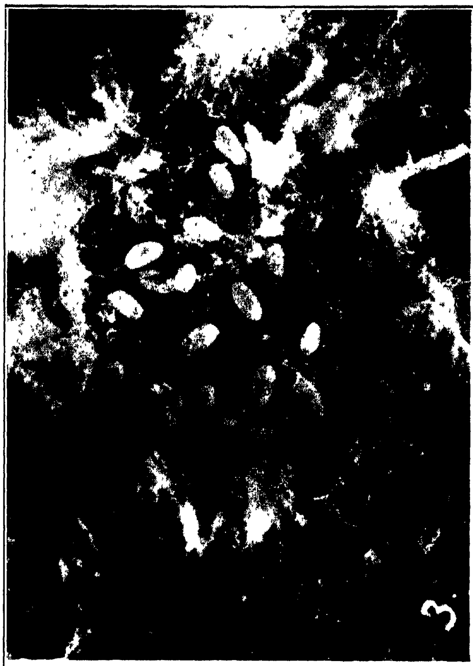
Plate XXVIII, Fig. 5.—Adults, two females, and one male. × 8.

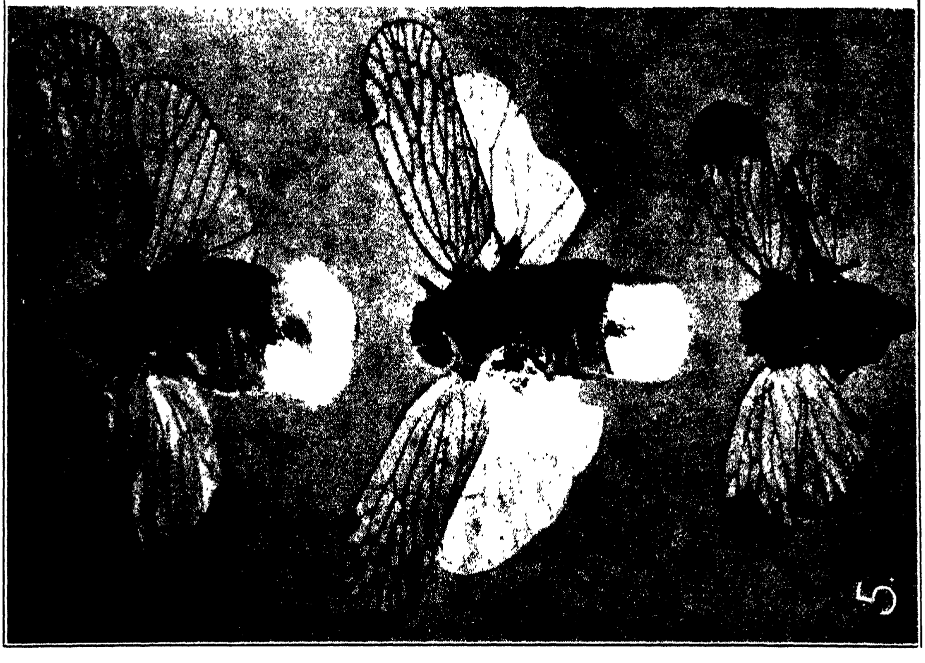


Life History of *Oliarus felis* Kirkaldy.

Photos., H. Hacker.

Face page 114.





Life History of *Oliarus felis* Kirkaldy.

Photos.. H. Hacker.

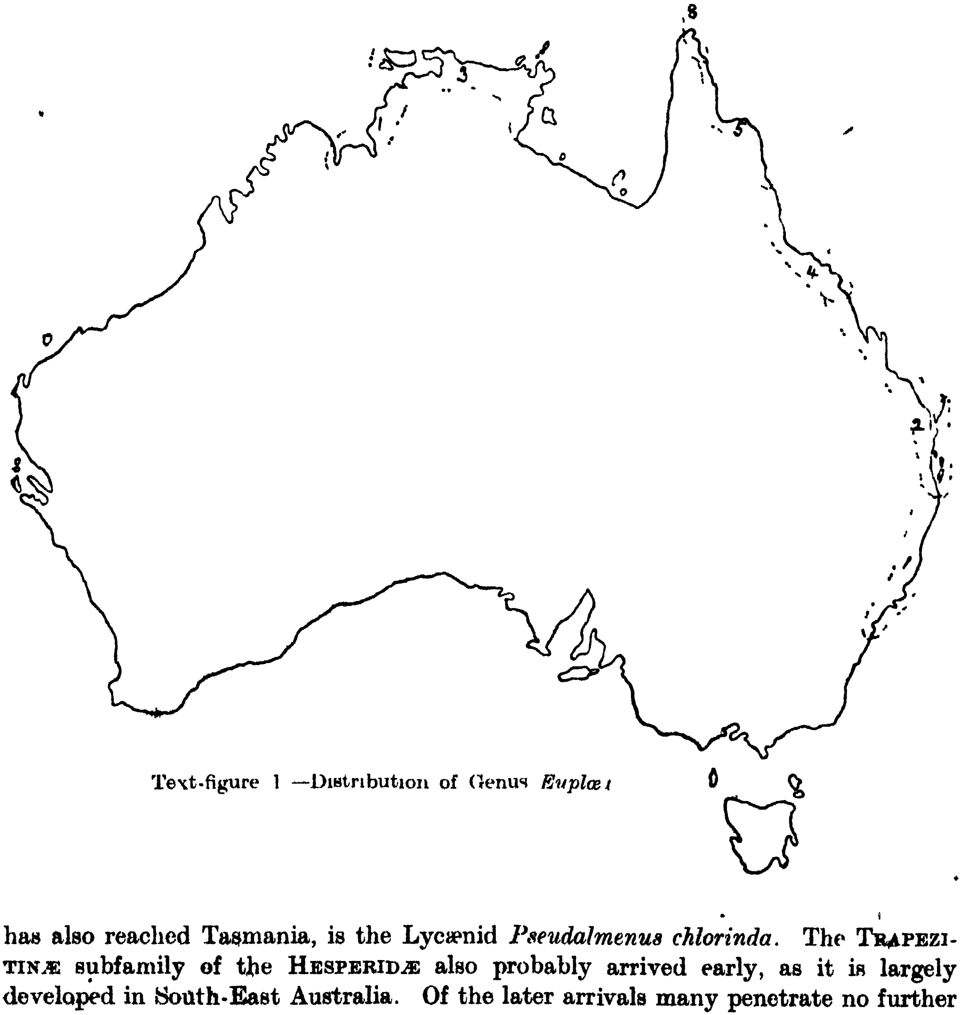
THE PRESENT DISTRIBUTION AND PAST HISTORY OF OUR AUSTRALIAN BUTTERFLIES.

By A. Jefferis Turner, M.D., F.E.S.

(Text figures 1–5.)

Australia is rich in Lepidoptera, and they are generally distributed all over the continent and its adjacent islands No doubt the extent to which the various families and higher groups are developed differs much according to the locality. The Lepidoptera of the Northern Territory are very different from those of Tasmania, and those of South-West Australia from those of Eastern Queensland · but in no part is there any deficiency Even in the usually arid interior Lepidoptera are abundant in good seasons. The number of species is there certainly considerably smaller than in the moister areas of the coastal regions and the mountains; but among them is a considerable proportion of peculiar species and even genera. We have indeed a lepidopterous fauna characteristic of arid regions throughout the continent. Furthermore, our Australian fauna has a high degree of peculiarity. Together with numerous groups which have an extensive or even a world-wide distribution, we have others which are either almost peculiar to Australia, or are much more extensively developed there than in other parts of the world. Among these, for example, are the Anthelidæ, the Cnethocampinæ section of the Notodontidæ, the Œnochromidæ, the Tineodinidæ, the Œcophoridæ, a section of the Xyloryctidæ, and a section of the Cossidæ

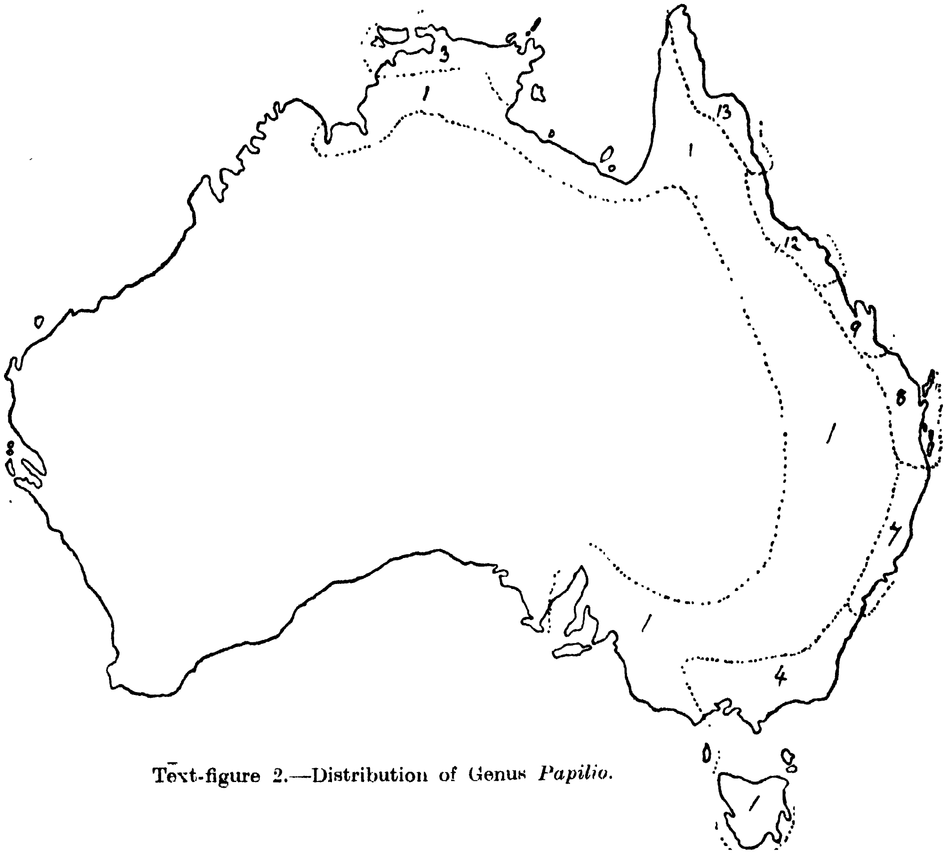
When we consider that section of the Lepidoptera known as the Rhopalocera or butterflies, we find a wholly different state of things So far as numbers go, they are not ill represented. We have nearly 350 species representing nearly every group found in the Eastern Hemisphere; but the distribution of the great bulk of them is confined to a very narrow area No butterflies are characteristic of the interior. To quote Waterhouse and Lyell's "Australian Butterflies":—"Not more than forty species have yet been recorded farther inland than the spurs of the main divide: we know of no Australian butterfly that has not been taken within a hundred miles of the coast." Butterflies are most abundant in species in the coastal region of Queensland and New South Wales, and the number of species diminishes as one proceeds southwards along this comparatively narrow coastal strip. From Victoria only some 86 species are recorded, from Tasmania 32, from South Australia probably 36, from South-West Australia 39. Nor is the Australian butterfly fauna of peculiar type; taken apart from our other Lepidoptera it can only be regarded as an unimportant division of the Indo-Malayan fauna. It may be stated broadly, that, with but few exceptions, our butterflies are descended from immigrants from the North across the shallow sea of Torres Strait, probably not an impassable barrier even now, and replaced in Pleistocene times by continuous land. The great bulk of this immigration appears to have been comparatively recent, though some is of older date. Of the latter we may cite *Papilio macleaynus*, which alone of its genus has reached Tasmania. This species has only one close ally now living, *Papilio weiskei*, which is confined to the mountains of New Guinea above 5,000 ft. Another early immigrant, which



Text-figure 1 —Distribution of Genus *Euplœa*

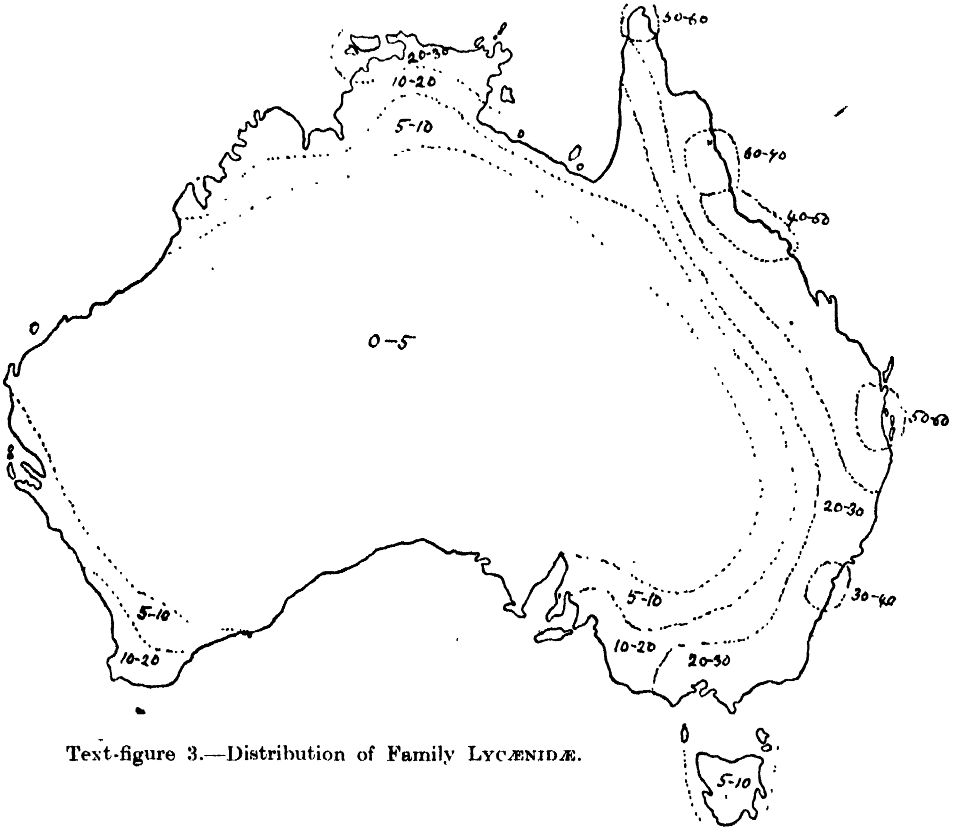
has also reached Tasmania, is the Lycænid *Pseudalmenus chlorinda*. The TRAPEZITINÆ subfamily of the HESPERIDÆ also probably arrived early, as it is largely developed in South-East Australia. Of the later arrivals many penetrate no further south than the Cairns district, others have reached Mackay or Yeppoon, and only a minority extend beyond the Manning River.

In order that the evidence for this conclusion may be appreciated we have selected certain groups for the construction of "Specific Contours" as suggested by Tillyard (Proc. Linnean Soc. N.S.W., 1914, p. 21). In Text-figure 1 is shown the distribution of the genus *Euplœa*, with the number of species in each area. It will be seen that the distribution is purely coastal, and the numbers decrease rapidly as one proceeds southwards. Eight species are known to occur at the apex of Cape York Peninsula, 5 in the Cairns district, 4 in the Townsville-Mackay district, 2 are found as far south as Brisbane, only one extends as far as Sydney. The genus has also a western extension along the northern coast ; 3 species reach to Darwin and one to Wyndham. Text-figure 2 is devoted to the genus *Papilio*. From Cape York to Cairns there are 13 species, thence to Mackay 12, to Yeppoon 9, to Brisbane 8, to Sydney 7, 4 are found in Victoria, and one in Tasmania. On the northern coast 3 species are found at Darwin, while one, *P. sthenelus*, is spread over a large extent of the interior from Wyndham to Adelaide. In the remainder of the continent the genus is unrepresented.



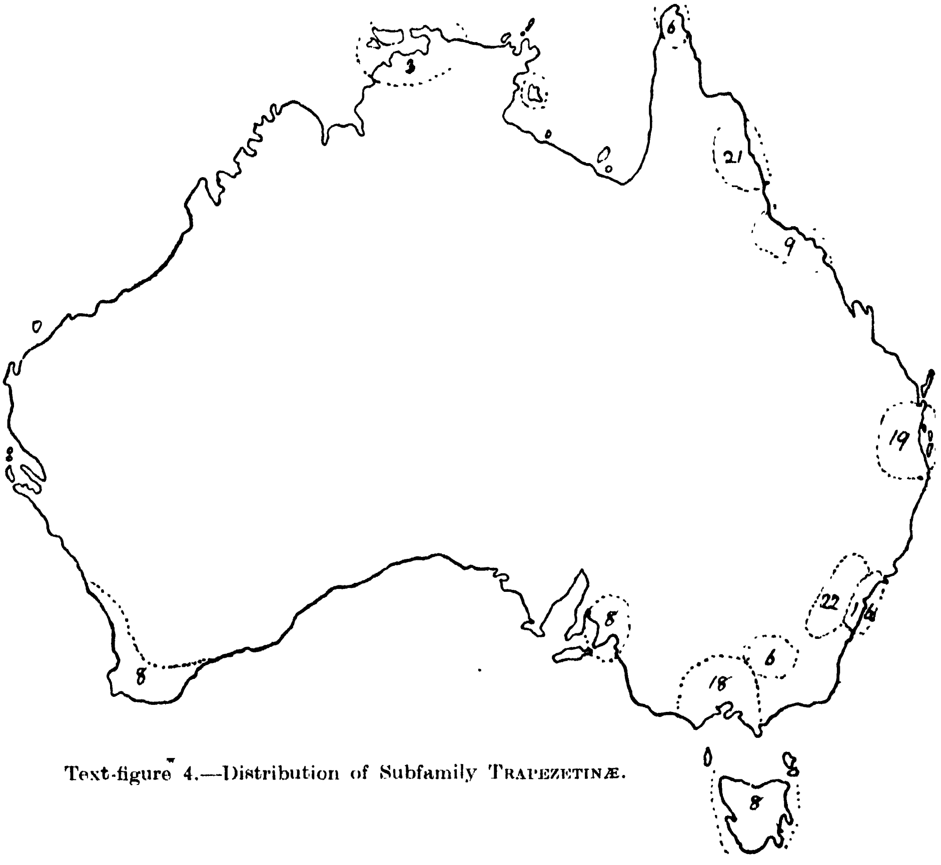
Text-figure 2.—Distribution of Genus *Papilio*.

The LYCÆNIDÆ is the largest family of butterflies in Australia, comprising some 115 species. They are generally distributed all over the continent, but in very unequal numbers. Our records are not sufficiently complete as to the range of the various species to allow us to draw the specific contours in the same manner as those of the preceding two genera, but by grouping the species in tens in Text-figure 3 a very fair approximation can be secured. It will be observed that as a whole the results are closely comparable to those already obtained, in spite of the existence of many species of which the known range is limited to a small area. The species are by far more abundant on the east coast and diminish gradually from north to south. Apparent exceptions are the larger numbers recorded from the Sydney, Brisbane, and Cairns districts, facts which may be mainly attributed to these districts having received special attention from collectors. In the latter two districts it may also be partly due to their inclusion of high altitudes, allowing the occurrence of mountain species in addition to those found at lower levels.



Text-figure 3.—Distribution of Family LYCÆNIDÆ.

We now come to a more difficult case, the **Trapezetinæ** subfamily of the **Hesperidæ**. Their distribution is not known in sufficient detail to permit of more than a modification of our method of contours, in which the number of species found in certain areas only is shown. We observe in Text-figure 4 that the largest number of species are found in five areas, all near the coast on the east of the continent. They are Central Victoria (18), the Blue Mountains (22), Sydney district (16), Brisbane district (19), Cairns district (21). So far as the map goes we observe that the group is an eastern one in Australia, but tolerably equably divided between north and south, and from this no definite conclusion can be drawn as to its place of origin. We may say, however, that it is known to occur in the islands to the north of Australia, that a large proportion of the species are confined to mountain areas, and that in our opinion the mountains of Papua will probably, when sufficiently explored, indicate that it has been indigenous there, and probably also in the Eastern Australian cordillera, since a very remote period.

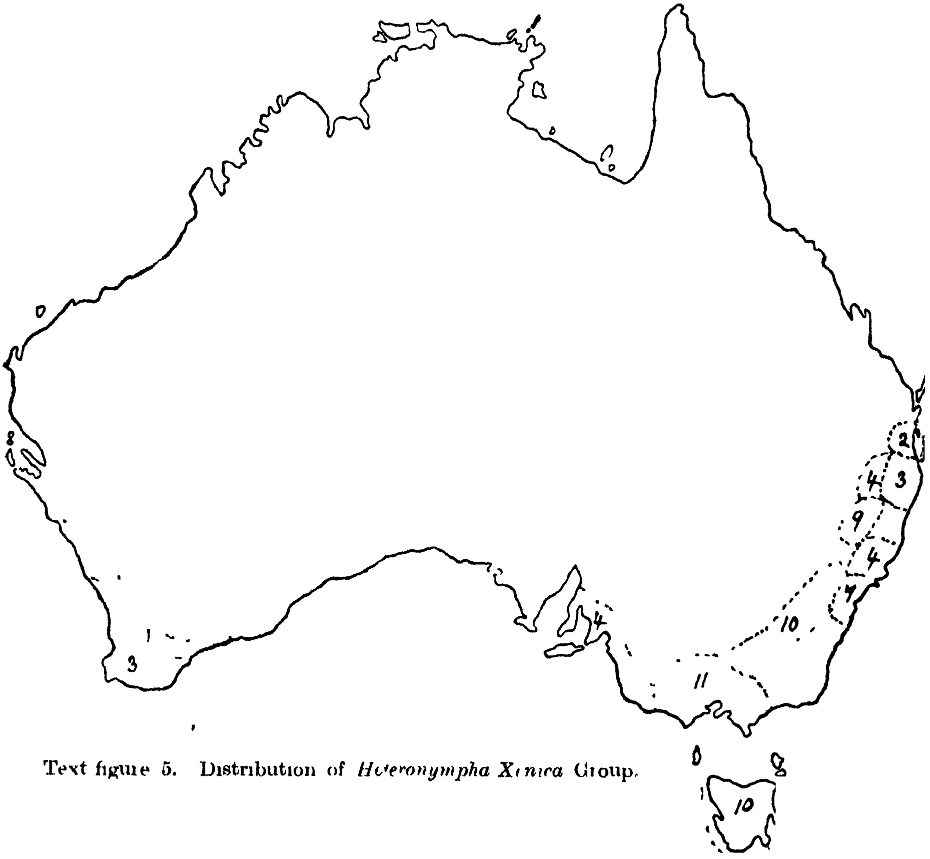


Text-figure 4.—Distribution of Subfamily Trapezetinæ.

We do not propose to extend this analysis to every group of the RHOPALOCERA. For the most part the results would be very similar to those given in our first three Text-figures. We shall, however, now consider certain exceptions. There is some evidence that half-a-dozen butterflies have reached Northern Australia, not by the Torres Strait route, but from Timor (Waterhouse and Lyell). As might be expected these are all strong-flying species. This route of immigration appears to have been of very subordinate importance On the eastern coast from Sydney northwards to Cape York and thence westward to Darwin occurs the peculiar Papilionid, found also in New Guinea, *Eurycus cressida* This is a very isolated form, having its nearest allies far distant in the Holarctic and Neotropical regions, and is an instance of what we may term Palæogenic distribution, which results from the surviving remnants of an ancient and once widely distributed group.

Of the 39 species found in South-West Australia 22 are identical with species found in the East of Australia, and their occurrence may be simply explained. They are species which range freely over the interior during favourable seasons, and for them the desert is no constant barrier. Sixteen differ from eastern species, many of them very slightly, so that they may be regarded merely as geographical races or subspecies Some of them must undoubtedly be regarded as good species, but all belong to genera more largely developed in the east. These sixteen species and subspecies we regard as immigrants from the east during Pleistocene times, when Australia as a whole enjoyed an abundant rainfall, and an identical marsupial fauna, including many extinct forms, some of them of giant size, ranged from east to west. By progressive desiccation these West Australian butterflies have been isolated from their kindred, and have undergone subspecific or specific modification There remains one West Australian butterfly, *Exometœca mysteris* Meyr , which belongs to the HESPERINÆ subfamily of the HESPERIDÆ or skipper butterflies. In Australia we have eight species of this subfamily referred to five genera. *Exometœca*, which contains only the one species, is its only representative in West Australia. The HESPERINÆ are of world-wide distribution, and an ancient group. West Australia was formerly a subcontinental island, which in late Cretaceous or early Tertiary times became united with the eastern portion of the continent by the elevation of Central Australia above the sea-level. Before this junction West Australia possessed a large and peculiarly Australian flora. We may be certain that it also possessed a peculiar lepidopterous fauna, and it is not unlikely that among these were representatives of the HESPERINÆ. If there were any West Australian butterflies in those old times, *Exometœca* may be their only surviving representative The evidence is not sufficient for certainty, but it is a tempting hypothesis.

A more important exception to the general rule of the distribution of our Australian butterflies is presented by a small number of genera, containing in all 21 species, which may be called the *Heteronympha-Xenica* group. Their headquarters are in South-East Australia and Tasmania, and they are essentially a temperate group, diminishing rapidly in numbers toward the north, in which direction they are attached mostly to the mountains, and not reaching the tropics. This is plainly shown in Text-figure 5, which is constructed on a similar plan to Text-figure 4. Ten species are known in Tasmania, 11 in Central Victoria, 10 in the Australian Alps and Blue Mountains, 7 in the Sydney district, 9 in New England. Only 2 species reach beyond the Macpherson Range and penetrate only a short distance into Southern Coastal Queensland. To the westward 4 species are found in South Australia and 3 in South-West Australia. It is possible that the *Heteronympha-Xenica* group may, like some other groups of our plants and insects, have an Antarctic origin. We know that a comparatively warm climate and tree-forests were present in Antarctica during the Tertiary period, and it is not unlikely that then Tasmania extended further south, and Antarctica further north. An actual land connection would not be necessary, as insects may under favourable conditions, such as strong winds and storms, be conveyed overseas for long distances. The only other possibility is that these temperate-loving butterflies crossed from north to south along our eastern cordillera during a glacial epoch. If their nearest relatives are found in the Papuan mountains, this latter hypothesis will be strengthened; if however they are found in Chile, the Antarctic theory will receive confirmation.



Text figure 5. Distribution of *Heteronympha Xenica* Group.

An interesting special case arises among these SATYRINÆ. The very common eastern species *Xenica klugi* is found also in South-West Australia, and with it a closely allied species, *X. minyas*, which is peculiar to that area. Now *minyas* and *klugi* must have had a common origin, and it seems difficult to explain why *klugi*, so constant in all the rest of its wide range, should in this area have branched into two species. Light is thrown on this problem by the third West Australian species *Heteronympha duboulayi*, which is extremely close to the eastern *H. merope*. Here the explanation is easy. *H. merope* crossed the continent to the west probably during moist Pleistocene times. Isolated by subsequent desiccation, it diverged slightly from the parent form, so slightly that by some it is regarded as only a subspecies. *X. minyas* arose, I believe, in the same way from *X. klugi*, and would certainly have been regarded as a subspecies if *klugi* were not found in the same area. *Klugi*, I consider, managed after a long interval to cross the desert a second time. This may have occurred during an exceptionally wet season, or series of wet seasons, unless we suppose, which is conceivable, that it was accidentally conveyed in fodder since the settlement of Australia. However that may be, its descendant *minyas* had by that time become sufficiently modified to prevent its interbreeding with the parent species.

NEW FISH RECORDS FOR QUEENSLAND.

By T. C. Marshall.

The following new fishes for Queensland are noted in order that the references may be included in the "Catalogue of the Fishes recorded from Queensland," by A. R. McCulloch and G. P. Whitley, which appears in this publication.

Family TRACHIPTERIDÆ.

TRACHYPTERUS JACKSONIENSIS (Ramsay).

On the 5th November, 1921, a fine specimen of this Ribbon-fish was washed ashore on the main beach at Southport, Southern Queensland, and, thanks to the kindly interest of Mr. Jack O'May, was forwarded the same day to the Queensland Museum. The specimen, which was received in very fair condition, is six feet six inches in length (snout protracted).

Ramsay first described this species as a *Regalecus*, and in 1897 J. D. Ogilby dealt with its affinities when describing a sub-species, *Trachypterus jacksoniensis polystictus*, from Newcastle, New South Wales.[1]

In the Southport specimen the dorsal portion of the caudal fin ends distinctly in front of the termination of the body. It consists of six short almost adpressed rays, no one of which is as long as the shortest ray in the lengthy dorsal series. This caudal fin is obliquely directed backward at an angle of 120° to the dorsal line. The ventral portion is modified into three short, naked, divergent spines.

The specimen figured by McCoy as *Trachypterus tænia*[2] (Bloch) and included by Ogilby in the synonymy of *T. jacksoniensis*, has four dark large spots on the body and a prominent ventral fin. In the Southport specimen the ventral fin is either entirely absent or so rudimentary as to be inconsequential, and the dark spots are lacking.

A few other features of special interest are noted. Behind the large eye (diameter 76 mm.) the head region is somewhat damaged. The dorsal and abdominal profiles are almost parallel in the anterior half of the body, the depth being approximately 225 mm. The dorsal fin, which appears to have been continuous, contains 176 rays. These are longest in the mid-dorsal region, where they attain a length of 92 mm. There are 14 rays in the pectoral fin, the maximum length being 89 mm.

[1] Ogilby, Proc. Linn. Soc. N.S.W., 1897, Vol. 22, p. 646-659.

[2] McCoy, Nat. Hist. Vic., Vol. II., pp. 83-85, Plate 122.

Owing to the absence of literature, I have been unable to compare our specimen with *Trachypterus semiophorus* of Bleeker, described from Amboino in 1868.[3]

When this Ribbon-fish was received at night by the Director (Mr. Heber Longman), its silvery surface was glowing with phosphorescence and it formed a remarkable object. In order to preserve it satisfactorily it was cut into two portions. Subsequently these were united and the specimen was placed on exhibition in formalin solution in a neatly-made cement tank with the exterior blackened and the interior enamelled white. As it was found impracticable to place a glass cover on this cement tank, the whole was enclosed in a large case with other specimens and casts. Except for the occasional need to replenish the formalin lost through evaporation, the specimen requires little attention and forms a popular exhibit.

FAMILY CEPOLIDÆ

CEPOLA AUSTRALIS Ogilby.[4]

A fine example of this rare species was caught off Moreton Island, in July 1923, by Mr. E. Sanders, who kindly forwarded it to the Queensland Museum. It measures 15½ inches in total length.

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[3] Bleeker, Arch. Néerl. Sc. Nat., III., 1868, pp. 279-280.

[4] Ogilby, Proc. Linn. Soc. N.S.W., XXIV., 1899, p. 185 ; McCulloch, Biol. Res. Endeavour, II., 3, 1914, p. 109, Pl. 34, 1.

A LIST OF THE FISHES RECORDED FROM QUEENSLAND WATERS.

BY ALLAN R. McCULLOCH, ICHTHYOLOGIST, AND GILBERT P. WHITLEY, ASSISTANT, AUSTRALIAN MUSEUM, SYDNEY.*

RESTRICTED to the use of such terms as can be printed with propriety, we can only write that the record of Queensland ichthyological work is unfortunate. The identifications of many of the fishes are far from satisfactory, and a considerable number of species, particularly those recorded by several writers in Australian publications, have been undoubtedly determined incorrectly

Collections from Cape York, Bowen, Cardwell, and other scattered localities, received at the British Museum, enabled Dr Günther to record a considerable number of species in his eight-volume Catalogue of Fishes, published in 1859-1870. Still others were added to the list by Drs Steindachner and Klunzinger who wrote in the publications of the Vienna Academy. These accomplished German and Austrian scientists, with that trait for systematic work which was almost a national virtue, laid a sound foundation for the work of later writers Unfortunately, they were followed by several less proficient ichthyologists, the elucidation and correction of whose errors have demanded both much patience and time of still later investigators.

Count François L de Castelnau wrote upon small collections of fishes from various parts of Queensland in the Proceedings of the Zoological and Acclimatisation Society of Victoria, and in the Victorian Official Record of the Philadelphia Exhibition, though why this latter should have been selected for the purpose is not explained Few, if any, of his Queensland types are preserved, but it seems that his hopelessly inaccurate and brief descriptions were based upon specimens of common tropical fishes which already had been described as new species more than once by his predecessors.

The late Sir William Macleay sailed along the Queensland coast in his own ship, the "Chevert," in the year 1875, and collected a large number of fishes by means of lines and nets, and among corals, etc., on the reefs. He described a considerable number of these as new species in a paper with Dr. H G. Alleyne, which was published in the first volume of the Proceedings of the Linnean Society of New South Wales. They were recorded again in the better known Catalogue of Australian Fishes, compiled by Macleay in the fifth, sixth, and ninth volumes of the same publication. An examination of his collections, now preserved in the Macleay Museum at the University of Sydney, proves most of these new species to be referable to older known fishes which are widely distributed throughout the Indian and Pacific Oceans, wherever there are coral reefs to afford that particular environment which is apparently their principal need.

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* By permission of the Trustees of the Australian Museum.

The appearance of Macleay's Catalogue of Australian Fishes, in 1881, provided the late Mr. C. W. De Vis, the then Director of the Queensland Museum, with a means of adding many more supposed new species in several papers in the Proceedings of the Royal Society of Queensland and of the Linnean Society of New South Wales. Unfortunately, it must be recorded that nearly all of his types, so far examined, have proved to by synonyms of still other, or even the same well-known species as had been dealt with previously by either his predecessors or his fellow workers.

The late Mr. W. Saville-Kent, as Commissioner of Fisheries for Queensland in the years 1889-90, recorded but little to advance our systematic knowledge of the fishes of that State. In two publications, "The Great Barrier Reef" and "A Naturalist in Australia," which are notable for their splendid photographic reproductions rather than accuracy of the statements in the text, he added still further nominal species to the Queensland list. With the assistance of Mr. De Vis, Kent compiled a list of what he considered to be the edible fishes known from the State, but this included many of doubtful identity and others which collectively form a formidable list of *nomina nuda.* The list appeared first in 1889 in a Parliamentary Report upon the food-fishes of Queensland, and later, at the end of the volume, dealing with the Barrier Reef. Some crude colour-sketches of fishes made in the field were reproduced in the latter, and being accompanied by scientific names, were accepted as established species by the compiler of the ichthyological portion of the Zoological Record of the day. But few of these have been again recognised, and it is probable that others are unrecognisable

The study of Queensland Fishes was elevated to a much higher plane when Mr. J. Douglas Ogilby, at one time ichthyologist of the Australian Museum, established himself in Brisbane Under the auspices of the Amateur Fishermen's Association of Queensland, he gathered together a fine collection of local fishes and wrote several important papers upon them. He was later appointed as zoologist to the Queensland Museum, to where the types of his many discoveries were transferred later. Though Ogilby added considerably to the already long list of synonyms in the Queensland list, he did more towards disentangling the errors of his predecessors than any other investigator The senior author of the present contribution here gratefully records his indebtedness to Mr. Ogilby for unfailing assistance and lasting friendship, which began when the first-named was a lad of thirteen years and flourished through the succeeding years.

In the year 1910, the Federal investigation ship "Endeavour" trawled along the Queensland coast northward to Bowen, and a very large collection of fishes was made, which included many not previously known from the State. A few of these were described by Ogilby, and others have been dealt with by McCulloch in the scientific reports upon the "Endeavour" collections.

The following list is but the basis of a more complete work we had intended to prepare, but illness of the senior author demands that its compilation be postponed. The collection of the Australian Museum has been recently greatly enriched by the efforts of Mr. E. H. Rainford of Bowen, and Surgeon-Lieutenant W. E. J. Paradice of H.M.A.S. "Geranium." Further, one of us (McCulloch) has collected extensively along the Great Barrier Reef and the coast of Northern Queensland With such abundant material before us, we had hoped to present a catalogue of Queensland fishes, which would be much more complete than the mere list we now offer. But, pressed by circumstances, we submit this basic list, which is merely a copy of the information afforded by a card-index of papers dealing with Queensland ichthyology

Class LEPTOCARDII.

Order AMPHIOXI

Family EPIGONICHTHYIDÆ.

Epigonichthys hedleyi Haswell. Murray Island—Haswell 39.

Epigonichthys cultellus Peters. Peel Island, Moreton Bay—Peters 132. Thursday Island—Gunther 37.

Asymmetron caudatum Willey Murray Island - Haswell 39, as *Heteropleuron lucayanum* Andrews

Family BRANCHIOSTOMIDÆ.

Branchiostoma belcheri Gray. Prince of Wales Island—Gunther 37.

Class ELASMOBRANCHII

Subclass SELACHII.

Order CESTRACIONTES.

Family HETERODONTIDÆ.

Heterodontus philippi Bloch & Schneider Moreton Bay—Kent 45, 48.

Gyropleurodus galeatus Gunther Coast of South Queensland—Ogilby 123

Order EUSELACHII.

Family ORECTOLOBIDÆ.

Orectolobus maculatus Bonnaterre. Moreton Bay—Ogilby & McCulloch 128.

Orectolobus devisi Ogilby. Moreton Bay—De Vis 155, as *Crossorhinus ornatus*. Queensland Coast—Ogilby 123.

Orectolobus ogilbyi Regan. Thursday Island—Kent 47 Torres Strait—Ogilby & McCulloch 128. Dunk Island—Ogilby 111.

Orectolobus tentaculatus Peters Cape York—Gunther 29.

Brachælurus modestus Gunther. Queensland—Gunther 33. Woody Point, Moreton Bay—Ogilby & McCulloch 128.

Heteroscyllium colcloughi Ogilby. Mud Island, Moreton Bay—Ogilby 112.

Stegostoma tygrinum Bonnaterre. Cape York—Ogilby 98. Normanton—Ogilby 111. Little Mulgrave River; Dunk Island—Ogilby & McCulloch 128. Southport—Ogilby 125. Cape Bowling Green (egg-case)—Ogilby 122.

Family HEMISCYLLIIDÆ.

Chiloscyllium ocellatum Bonnaterre. Cape York—Gunther 32. Torres Strait—Macleay 56. Murray Island; Hope Island; Masthead Island—Ogilby & McCulloch 128.

Chiloscyllium trispeculare Richardson. Cape York—Gunther 29.

Chiloscyllium punctatum Muller & Henle. Thursday Island—Regan 138 Dunk Island; Moreton Bay—Ogilby & McCulloch 128.

Family GINGLYMOSTOMIDÆ

Nebrius concolor Ruppell. Darnley Island—Ogilby 120.

Family SCYLLIORHINIDÆ.

Halælurus labiosus Waite. Bramble Bay—Gunther 32, as *Scyllium maculatum*. This locality is evidently Bramble Cay, Torres Strait, *vide* Ogilby 98

Family GALEIDÆ

Mustelus antarcticus Gunther. South Queensland—Ogilby 123.

Galeorhinus australis Macleay. Moreton Bay—Ogilby 112, 123.

Galeocerdo arcticus Faber. Queensland coast—Ogilby 123.

Carcharhinus stevensi Ogilby. Bustard Bay; Nor-west Islet—Ogilby 117.

Carcharhinus amblyrhynchos Bleeker. Cape Bowling Green—Ogilby 123.

Carcharhinus melanopterus Quoy & Gaimard. Torres Strait—Macleay 56. Murray Island—McCulloch 66. Off Moreton Bay; Nor-west Islet; Darnley Island—Ogilby 123.

Carcharhinus spenceri Ogilby. Brisbane River- Ogilby 116. Moreton Bay; Great Sandy Strait; Old Woman Island; Hervey Bay; Rocky Island Reef—Ogilby 123.

Rhizoprion crenidens Klunzinger. Queensland—Klunzinger 49. Burnett River Heads—Ogilby 95. Moreton Bay; Cape Moreton; Double Island Point; Rocky Island Reef—Ogilby 123.

Aprionodon acutidens Rüppell. Torres Strait—Macleay 56.

Scoliodon jordani Ogilby. Outer Caloundra Bank—Ogilby 112.

Scoliodon affinis Ogilby. Noosa Head—Ogilby 118.

Scoliodon acutus Rüppell. Burnett River—Ogilby 97.

Scoliodon longmani Ogilby. Moreton Bay—Ogilby 118.

Physodon mulleri Muller & Henle. Cape York—Macleay 56.

Physodon taylori Ogilby. Townsville—Ogilby 122.

Family ALOPIIDÆ.

Alopias vulpinus Bonnaterre. Moreton Bay (Welsby & Appel)—Ogilby 123.

Family CARCHARIIDÆ.

Carcharias arenarius Ogilby. Moreton Bay—Ogilby 123.

Family LAMNIDÆ.

Isurus glaucus Muller & Henle. Bulwer, Moreton Bay—Ogilby 123.

Carcharodon carcharias Linnæus. Moreton Bay—Ogilby 123.

Family SPHYRNIDÆ.

Sphyrna, Eusphyra, blochii Cuvier. Rockingham Bay —Ogilby 123.

Sphyrna, Sphyrna, lewini Lord. Queensland (Haswell) —Ramsay 134. Moreton Bay—Ogilby 123.

Sphyrna, Sphyrna, zygæna Linnæus. Moreton Bay—Peters 132.

Sphyrna, Platysqualus, tudes Cuvier. Moreton Bay—Ogilby 111. Cabbage-tree Creek; Brisbane River; South Hill; Double Island Point—Ogilby 123.

Order BATOIDEI.

Family PRISTIDÆ.

Pristis zysron Bleeker. Moreton Bay—Macleay 56. Queensland coast—Ogilby 123.

Pristis clavata Garman. Queensland coast—Ogilby 123.

Pristis microdon Latham. Moreton Bay—Ogilby 123.

Family RHINIDÆ.

Rhamphobatis ancylostoma Schneider. Queensland—Kent 47. Moreton Bay—Ogilby 111. Dunk Island—Ogilby 123.

Rhynchobatus djiddensis Forskal. Moreton Bay; Cartwright Point; Nor-west Islet—Ogilby 123.

Family RHINOBATIDÆ.

Rhinobatus banksii Muller & Henle. Cape York—Ogilby 95, as *R. bougainvillii.* South Hill; Moreton Bay; Cartwright Point; Low Bluff; Double Island Point; Hervey Bay; Platypus Bay; Bustard Bay, Hummocky Island—Ogilby 123.

Rhinobatus granulatus Cuvier. Cape York—Gunther 32. Torres Strait to Moreton Bay—Kent 47. Moreton Bay—Tosh 152.

Rhinobatus armatus Gray. Queensland coast—Ogilby 123. Moreton Bay—Ogilby 122.

Family RAJIDÆ.

Raja australis Macleay. Cape Moreton—Ogilby 123.

Raja polyommata Ogilby. Cape Moreton; North Reef—Ogilby 114.

Family TORPEDINIDÆ.

Hypnaroe subnigra Dumeril. Off South Hill; Cape Moreton—Ogilby 125.

Family DASYATIDÆ.

Urolophus testaceus Muller & Henle. Cape Upstart—Gunther 32. Off Fraser Island—McCulloch 72. Jumping Pin, Moreton Bay—Tosh 152. Cape Moreton; South Hill; Low Bluff; Double Island Point—Ogilby 123.

Dasyatis kuhlii Muller & Henle. Moreton Bay—Tosh 152. Coolangatta; Currumbin; Nerang Creek; Moreton Bay; Brisbane River; Hervey Bay; Port Curtis; Nor-west Islet: Edgecombe Bay—Ogilby 123. Off Bustard Head—McCulloch 80.

Dasyatis sp. ? Queensland—Kent 47, as *Trygon pastinaca.*

Dasyatis fluviorum Ogilby. Brisbane River, above tides—Ogilby 112. Nerang Creek; Great Sandy Strait; Moreton Bay—Ogilby 123.

Himantura uarnak Forskal. Lower Burdekin River—Macleay 58. Queensland coast—Stead 145. Moreton Bay—Tosh 152. Moreton Bay; Platypus Bay; Pine Peak; Goode Island, Torres Strait—Ogilby 123.

Pastinachus sephen Forskal. Lower Burdekin River—Macleay 58. Moreton Bay—Ogilby 123.

Tæniura mortoni Macleay. Lower Burdekin River—Macleay 58.

Tæniura lymna Forskal. Cape York—Ogilby 95. Darnley Island—Ogilby 118. Murray Island; Port Douglas: St. Crispin Reef—McCulloch 78. Green Island—Ogilby 123.

Urogymnus africanus Bloch. Cape York—Macleay 56. Darnley Island—Ogilby 123.

Pteroplatea australis Ramsay & Ogilby. Moreton Bay—Ogilby 111.

Family MYLIOBATIDÆ.

Myliobatis australis Macleay. Lady Elliott Island—Kent 47.

Myliobatis hamlyni Ogilby. Moreton Bay—Ogilby 117.

Aëtobatis narinari Euphrasen. Cape York—Macleay 56. Moreton Bay; Wide Bay—Ogilby 123.

Family RHINOPTERIDÆ.

Rhinoptera neglecta Ogilby. Moreton Bay—De Vis 159, as *R. javanica* Muller & Henle.

Family MOBULIDÆ.

Mobula eregoodoo Cantor. Palm Islands—Kent 47. Moreton Bay—Ogilby 123.

Subclass HOLOCEPHALI. Order CHIMÆROIDEI.

Family CALLORHYNCHIDÆ.

(**Callorhynchus millii** Bory. Port Denison—Gunther 32, as *C. antarcticus*. Record incorrect.)

Class PISCES. Subclass DIPNEUSTA.

Order SIRENOIDEI. Family CERATODONTIDÆ.

Neoceratodus forsteri Krefft Wide Bay—Krefft 50. Mary River—Gunther 36, as *Ceratodus miolepis*. Fitzroy River—Castelnau 8, as *N. blanchardi*. Eidsvold, Burnett River—Johnston & Bancroft 40 Introduced into Coomera River; North Pine River, Albert River; Cressbrook; Enoggera; Bundaberg, Warwick, Condamine River, Brisbane—O'Connor 94. Burnett River—Weber 170 Burnett River—Macleay 56; the range was incorrectly extended to the Dawson River by Macleay *loc. cit.*

Ompax spatuloides Castelnau Burnett River—Castelnau 11 See Gunther, Zool. Record xvi, (1879) 1881, Pisces p 5

Subclass ACTINOPTERI. Superorder TELEOSTEI.

Order ISOSPONDYLI. Family ELOPIDÆ.

Elops hawaiiensis Regan. Brisbane—Castelnau 9, as *E. saurus* Endeavour River—Klunzinger 49 Lower Burdekin River—Macleay 58 Moreton Bay—Ogilby 119.

Family MEGALOPIDÆ

Megalops cyprinoides Broussonet Mary River—Gunther 36 Cape York—Steindachner 147, and Gunther 30 Lagoon near Brisbane—Castelnau 7, as *Brisbania staigeri*. Lower Burdekin River—Macleay 58 Rockhampton; Townsville—Kent 47. Moreton Bay Kent 48, and Ogilby 119.

Family ALBULIDÆ

Albula vulpes Linnæus North Queensland—Kent 47, as *A conorhynchus*. Southport—Ogilby 112 Moreton Bay Ogilby 119, as *A glossodonta*

Family OSTEOGLOSSIDÆ

Scleropages leichhardti Gunther Queensland—Gunther 26 Dawson River—Macleay 56. Fitzroy River—Kent 47 Dawson River—Bancroft 3

Scleropages jardinei Kent. Rivers of Gulf of Carpentaria—Kent 46 Batavia, Norman, and Gregory Rivers—Kent 47

Scleropages guentheri Castelnau Queensland—Castelnau 8.

Family CHIROCENTRIDÆ.

Chirocentrus dorab Forskal. Somerset, Cape York—Gunther 36. Queensland—Klunzinger 49. Lower Burdekin River—Macleay 58. Torres Strait—Kent 47.

Family DUSSUMIERIIDÆ.

Dussumieria hasseltii Bleeker. Cape York—Ogilby 123.*

Stolephorus robustus Ogilby. Southport—Ogilby 111. Moreton Bay—Ogilby 119. Bulwer—McCulloch 78.

Stolephorus delicatulus Bennett. Darnley Island—Alleyne & Macleay 1. Murray Island—McCulloch 66, and Ogilby 123.

Family CLUPEIDÆ.

Clupea profundus Kent. Queensland—Kent 47. *Nom. nud.*

Clupea torresiensis Kent. Queensland—Kent 47. *Nom. nud.*

Clupea ranelayi Kent. Queensland—Kent 47. *Nom. nud.*

Clupea macrolepis Steindachner. Townsville; Cleveland Bay—Steindachner 150.

Sardinella gibbosa Bleeker. Bramble Cay, Torres Strait—Alleyne & Macleay 1, as *C. tembang* Bleeker.

Harengula castelnaui Ogilby. Queensland—Klunzinger 49, as *C. hypselosoma* Bleeker. Lower Burdekin River—Macleay 58, as *C. sundaica* Bleeker. Torres Strait—Kent 47. Moreton Bay—Ogilby 119. Nerang River—Tosh 152.

Harengula punctata Rüppell. Darnley Island—Ogilby 105, as *H. stereolepis*. Murray Island—McCulloch 66, as *Sardinella kunzei* Bleeker. Darnley Island—Cockerell 14, as *Sardinella moluccensis* Bleeker.

Sardinia neopilchardus Steindachner. Moreton Island—Ogilby 110 Moreton Bay—Ogilby 119. Hervey Bay Ogilby 123.

Potamalosa novæ-hollandiæ Cuvier & Valenciennes Queensland—Kent 47. No reliance can be placed on this identification, and further proof of the occurrence of this fish in Queensland is necessary.

Hyperlophus vittatus Castelnau. Southport—Ogilby 111, as *H. copii.* Mud Island—Ogilby 112. Moreton Bay—McCulloch 75.

Ilisha hœvennii Bleeker. Between Cairns and Rockhampton—McCulloch 83.

Family DOROSOMIDÆ.

Nematalosa come Richardson. Queensland—Kent 47, as *Chatoessus nasus* Burnett River—Weber 170. Queensland, marine—Ogilby 122.

Nematalosa erebi Gunther Tiaro, Mary River; ? 27° 9′ S. lat. 144° E long—Gunther 36. Cape York—Gunther 30. Brisbane River: Norman River—Castelnau 9. Burnett River; Fitzroy River—Macleay 53. Palmer River—Macleay 57. Lower Burdekin River—Macleay 58. Burnett River—Weber 170. Norman River—Ogilby 122.

Nematalosa horni Zeitz. Bulloo Creek—Regan 141.

Nematalosa elongatus Macleay. Mary River—Macleay 58. Longreach, Thomson River—Johnston & Bancroft 42.

Family CHANIDÆ.

Chanos chanos Forskal. Cape York—Steindachner 147, and Gunther 30. Lower Burdekin River—Macleay 58. Moreton Bay—O'Connor 92, and Ogilby 119.

Family ENGRAULIDÆ.

Engraulis australis Shaw. Southport—Ogilby 112. Moreton Bay—Ogilby 119.

Anchoviella nasutus Castelnau. Norman River—Castelnau 10. Brisbane River—De Vis 153.

Anchoviella carpentariæ De Vis. Norman River—De Vis 153.

Anchoviella heterolobus Klunzinger. Cleveland Bay—Klunzinger 49.

Anchoviella æstuaria Ogilby. Brisbane River—De Vis 153, as *Engraulis sp.* Brisbane and other rivers of S.E Queensland—Ogilby 116 Moreton Bay—Ogilby 119

Thrissocles mystax Bloch & Schneider. Queensland—Klunzinger 49

Thrissocles setirostris Broussonet. Cooktown—Ogilby 120.

Thrissocles hamiltoni Gray Lower Burdekin River—Macleay 58

Thrissocles dussumieri Cuvier & Valenciennes ? Queensland—Weber & Beaufort 172.

Family SALMONIDÆ

Salmo fario Linnæus Brisbane, introduced -O'Connor 92.

Family RETROPINNIDÆ

Retropinna semoni Weber Burnett River -Weber 170 Enoggera Creek—Ogilby 111. Upper Noosa River -Ogilby 125. Eidsvold, Ithaca Creek, near Brisbane—McCulloch 78

Family GALAXIIDÆ.

Galaxias olidus Gunther Queensland ?—Gunther 27

Galaxias oconnori Ogilby Lyra, near Stanthorpe -Ogilby 118

Family ALEPOCEPHALIDÆ.

Alepocephalus niger Gunther 75 miles E S E of Raine Island, 1,400 faths—Gunther 35.

Family STOMIATIDÆ.

Pachystomias microdon Gunther Coral Sea, about 500 miles from the Queensland coast, 2,440 fathoms—Gunther 38

Family GONORHYNCHIDÆ

Gonorhynchus parvimanus Ogilby Moreton Bay -Ogilby 119 Young of *G greyi* Richardson ?

Order EVENTOGNATHI. Family CYPRINIDÆ.

Carassius carassius Linnæus. Queensland, introduced—O'Connor 92

Leuciscus australis Castelnau. Norman River—Castelnau 10.

Tinca tinca Linnæus Queensland, introduced -O'Connor 92

Order NEMATOGNATHI. Family PLOTOSIDÆ.

Plotosus anguillaris Lacepede Moreton Bay—Gunther 25 Endeavour River—Macleay 56.

Plotosus laticeps Kent. Queensland—Kent 47. *Nom. nud.*

Paraplotosus albilabris Cuvier & Valenciennes. Dunk Island—Ogilby 112.

Tandanus tandanus Mitchell. Tiaro, Mary River—Gunther 36. Burnett River—Weber 170. Moreton Bay rivers—Ogilby 119. Upper Noosa River—Ogilby 125.

Tandanus labrosus (De Vis) Kent. Queensland—Kent 47. *Nom. nud.*

Tandanus lævis (De Vis) Kent. Queensland—Kent 47. *Nom. nud.*

Tandanus curtus Kent. Queensland—Kent 47. *Nom. nud.*

Tandanus, Neosilurus, hyrtlii Steindachner. Queensland, 27° 9′ S. lat. 144° E. long.—Gunther 36. Mary River—Macleay 58. Fitzroy River, Rockhampton—Steindachner 146. Cape York—Castelnau 7, as *Silurichthys australis*. Rockhampton—Castelnau 9. Rockhampton or Brisbane River (probably Rockhampton)—Castelnau 10, as *Eumeda elongata*. Palmer River—Macleay 57. Bulloo River—Johnston & Bancroft 42. Moreton Bay rivers—Ogilby 119.

Tandanus, Neosilurus, robustus Ogilby. Keppel Bay—Ogilby 111.

Tandanus, Neosilurus, mediobarbis Ogilby. Queensland ?—Ogilby 111.

Tandanus, Neosilurus, brevidorsalis Gunther. Cape York—Gunther 29.

Endorrhis longifilis Macleay. Long Island, Torres Strait—Macleay 56.

Euristhmus elongatus Castelnau. Brisbane River—Castelnau 9. Norman River—Castelnau 10.

Euristhmus lepturus Gunther. Queensland ?—Alleyne & Macleay 1. Moreton Bay—Ogilby 119.

Family ARIIDÆ.

Tachysurus broadbenti Ogilby. Cape York—Ogilby 111.

Netuma thalassina Rüppell. Torres Strait—Alleyne & Macleay 1. Queensland—Klunzinger 49. Moreton Bay—Kent 47, and Ogilby 119.

Netuma australis Gunther. Tiaro, Mary River—Gunther 36. Norman River Castelnau 10. Burdekin River ; Mary River—Macleay 58. Burnett River—Weber 170. Moreton Bay—Ogilby 119.

Neoarius curtisii Castelnau. Moreton Bay—Castelnau 9.

Neamapteryx stirlingi Ogilby. N.E.Queensland—Ogilby 111.

Order SYMBRANCHIA. Family AMPHIPNOIDÆ.

Amphipnous cuchia H. Buchanan. Edeombe (? = Edgecombe) Bay—Ogilby 109.

Family FLUTIDÆ.

Fluta alba Zuiew ? Cowan Cowan, Moreton Bay.—Ogilby 125.

Order APODES. Family ANGUILLIDÆ.

Anguilla mauritiana Bennett. Mary River—Gunther 36.

Anguilla marginipinnis Macleay. Lillesmere Lagoon, Burdekin River—Macleay 58.

Anguilla australis Richardson. Queensland—Kent 47.

Anguilla reinhardtii Steindachner. Fitzroy River, Rockhampton—Steindachner 146. Cape York—Gunther 32. Mary River; Lillesmere Lagoon, Burdekin River—Macleay 58. Burnett River—Weber 170. Upper Noosa River—Ogilby 125.

Family LEPTOCEPHALIDÆ.

Leptocephalus labiatus Castelnau. South Queensland—Kent 47. Moreton Bay—Ogilby 121.

Leptocephalus marginatus Valenciennes. Low Island Reef, Torres Strait—Alleyne & Macleay 1. Torres Strait—Waite 167.

Leptocephalus conger Linnæus. Endeavour River—Macleay 56, as *Conger vulgaris.*

Family MURÆNESOCIDÆ.

Muræenesox cinereus Forskal. Brisbane River—Castelnau 9.

Family ECHELIDÆ.

Muræenichthys godeffroyi Regan. Bowen—Regan 139.

Family OPHICHTHYIDÆ.

Leiuranus semicinctus Lay & Bennett. Murray Island—McCulloch 62. Darnley Island—Ogilby 118.

Ophichthys cephalozona Bleeker. Cape York—Gunther 32.

Ophichthys elapsoides Castelnau. Cape York—Castelnau 7.

Ophichthys episcopus Castelnau. Moreton Bay—Castelnau 9.

Family MORINGUIDÆ.

Moringua javanicus Kaup. Thursday Island—Weber 170.

Family MURÆNIDÆ.

Evenchelys macrura Bleeker. Pine River; Brisbane River—Ogilby 109.

Echidna nebulosa Ahl. Trinity Bay—Gunther 32. Reefs of Queensland and Torres Strait—Alleyne & Macleay 1.

Echidna polyzona Richardson. Torres Strait—Ogilby 109.

Uropterygius concolor Rüppell. Cape York—Gunther 32.

Gymnothorax petelli Bleeker. Queensland—Kent 47.

Gymnothorax prasinus Richardson ? Queensland—Kent 47, as *Muræna afra.*

Gymnothorax javanicus Bleeker. Darnley Island—Richardson 143.

Gymnothorax pictus Ahl. Moreton Bay—Castelnau 11, as *Muræna siderea.*

Gymnothorax favagineus Bloch & Schneider. Endeavour River—Macleay 56, as *Muræna tesselata.* Great Barrier Reef—Kent 47. Endeavour River—Ogilby 109.

Gymnothorax stellatus Lacepede. Torres Strait reefs—Alleyne & Macleay 1.

Gymnothorax undulatus Lacepede. Cape Upstart—Richardson 143. Low Island, Torres Strait—Alleyne & Macleay 1. Port Denison—Klunzinger 49.

Gymnothorax melanospilus Bleeker. Darnley Island. Alleyne & Macleay 1.

Gymnothorax pseudothyrsoides Bleeker. Darnley Island—Alleyne & Macleay 1.

Gymnothorax makassariensis Bleeker. Cape York—Gunther 32.

Gymnothorax margaritophorus Bleeker. Wide Bay district—Ogilby 118.

Gymnothorax sp. ? Queensland—Kent 47, as *Anguilla richardsonii.*

Order INIOMI. Family AULOPIDÆ.

Aulopus purpurissatus Richardson. Off Moreton Bay; Laguna Bay; Tewantin; Mount Tempest—Ogilby 112.

Family SYNODONTIDÆ.

Saurida argentea Macleay. Endeavour River—Macleay 56. Cooktown; Townsville; Bowen—Kent 47.

Saurida tumbil Bloch. Queensland—Klunzinger 49, as *S. undosquamis.*

Saurida grandisquamis Gunther. Cape Grenville—Alleyne & Macleay 1.

Saurida filamentosa Ogilby. Off Cape Moreton—Ogilby 114.

Synodus japonicus Houttuyn. Murray Island—McCulloch 81.

Synodus houlti McCulloch. Capricorn Group—McCulloch 81.

Synodus similis McCulloch. Capricorn Group—McCulloch 81.

Trachinocephalus myops Forster. Moreton Bay—Ogilby 121, as *T. limbatus.* Eydoux & Souleyet.

Xystodus banfieldi Ogilby. Near Dunk Island—Ogilby 115.

Family MYCTOPHIDÆ.

Dasyscopelus cuvieri Castelnau. Nob or Knob Island, Torres Strait—Castelnau 6.

Order AULOSTOMI. Family AULOSTOMIDÆ.

Aulostomus chinensis Linnæus. Nob or Knob Island—Castelnau 6.

Family FISTULARIIDÆ.

Fistularia serrata Cuvier. Nob or Knob Island—Castelnau 6. Cooktown; Lady Elliott Island; Moreton Bay—Kent 47.

Family MACRORHAMPHOSIDÆ.

Macrorhamphosus elevatus Waite. Queensland—Kent 47, as *Centriscus scolopax.* Off Cape Moreton—Ogilby 114, as *M. lancifer.* Moreton Bay—Ogilby 114, as *M. robustus.*

Macrorhamphosus velitaris Pallas. Moreton Bay—De Vis 161.

Family CENTRISCIDÆ.

Æoliscus strigatus Gunther. Cape York—Castelnau 7.

Centriscus sp. Ramsay. Wide Bay—Ramsay 136, as *Amphisile.*

Centriscus cristatus De Vis. Noosa—De Vis 158. Queensland—Kent 47, as *Amphisile scutata.* Moreton Bay to Hummocky Island; Boomerang Hill; Jenny Lind Buoy, Port Curtis; Cape Capricorn; Double Island Point, Hervey Bay; Platypus Bay; Bustard Bay—Ogilby 117. Cooktown—McCulloch 70.

Centriscus scutatus Linnæus. Thursday Island—Weber 89, and Weber & Beaufort 125.

Order THORACOSTEI. Family SYNGNATHIDÆ.

Syngnathus nitidus Gunther. Bowen—Duncker 19.

Corythoichthys altirostris Ogilby. Moreton Bay—Ogilby 99

Corythoichthys fasciatus Gray. Cairns Reef, off Cooktown—McCulloch 61, as *C. waitei.* Darnley Island—Ogilby 120.

Corythoichthys pœcilolæmus Peters. Noble Island—Sauvage 144, as *Syngnathus modestus.*

Corythoichthys margaritifer Peters Queensland ?—Castelnau 7. Bowen—Duncker 18.

Halicampus koilomatodon Bleeker. Thursday Island, Prince of Wales Island—Gunther 37, as *Syngnathus trachypoma.*

Micrognathus brevirostris Rüppell. Thursday Island—Weber 170, as *Syngnathus tetrophthalmus* Bleeker. Cape York—Ogilby 111, as *Corythoichthys spinicaudatus*

Ichthyocampus cinctus Ramsay. Moreton Bay—Ogilby 111.

Ichthyocampus tryoni Ogilby. Moreton Bay—Ogilby 99

(**Ichthyocampus galei** Duncker. Wrongly recorded from Queensland by Boulenger 5.)

Ichthyocampus maculatus Alleyne & Macleay. Darnley Island—Alleyne & Macleay 1.

Microphis brachyurus Bleeker. Moreton Bay—Ogilby 118, as *Doryichthys sticto-rhynchus.*

Doryrhamphus melanopleura Bleeker. Murray Island; Cairns Reef; Masthead Island—McCulloch 61, as *Microphis pleurotœnia* Gunther.

Chœrichthys brachysoma Bleeker. Port Molle—Gunther 37, as *Doryichthys serialis.* Cape York—Duncker 18, as *C. valenciennei* Kaup.

Stigmatopora nigra Kaup. Bulwer—Ogilby 118.

Syngnathoides biaculeatus Bloch. Cape York—Gunther 32. Torres Strait—Littlejohn 131.

Solegnathus guntheri Duncker. Moreton Bay—Kent 48, as *Solengognathus hardwickii.*

Haliichthys tæniophorus Gray. Cape York—Gunther 36. Prince of Wales Island—Weber & Beaufort 173.

Hippocampus hippocampus Linnæus. Cape York—Gunther 32, as *H. antiquorum.*

Hippocampus dahli Ogilby. Moreton Bay; Noosa—Ogilby 111.

Hippocampus spinosissimus Weber. Thursday Island—Weber 170, as *H.* (*erinaceus* Gunther ?).

Acentronura tentaculata Gunther. Mabuiag, Torres Strait—Duncker 19.

Order HYPOSTOMIDES. Family PEGASIDÆ.

Pegasus volitans Linnæus. Queensland coast—Ogilby 118, as *P. draconis* Linnæus.

Parapegasus natans Linnæus. Somerset, Cape York—Gunther 36. Hammond Island, Torres Strait; Moreton Bay—Gunther 32. Off Cape Capricorn and Double Island Point—McCulloch 70.

Order SYNENTOGNATHI. Family BELONIDÆ.

Tylosurus strongylurus van Hasselt. Somerset, Cape York—Gunther 36. Thursday Island—Ogilby 120, as *T. caudimaculatus* Cuvier.

Tylosurus macleayanus Ogilby. Moreton Bay—Ogilby 112, as *T. impotens.*

Tylosurus gavialoides Castelnau. Queensland—Kent 47.

Tylosurus krefftii Gunther. Norman River—Castelnau 10 Burdekin River—Macleay 58. Fitzroy River, Rockhampton—Kent 47.

Tylosurus depressus Poey. Moreton Bay—Kent 47.

Tylosurus giganteus Temminck & Schlegel. Somerset, Cape York—Gunther 36. Percy Islands; Cape York—Alleyne & Macleay 1, as *Belone annulata* Cuvier & Valenciennes. Port Denison—Klunzinger 49. Moreton Bay—De Vis 162.

Tylosurus coromandelicus van Hasselt. Cape York—Alleyne & Macleay 1, as *Belone melanotus* Bleeker.

Tylosurus quoyi Cuvier & Valenciennes. Endeavour River—Klunzinger 49.

Tylosurus staigeri Kent. Queensland—Kent 47. *Nom. nud.*

Tylosurus tyrannus Kent. Queensland—Kent 47. *Nom. nud.*

Tylosurus vorax Kent. Queensland—Kent 47. *Nom. nud.*

Tylosurus ferox Gunther. Queensland—Castelnau 9.

Athlennes hians Cuvier & Valenciennes. Moreton Bay—Ogilby 123, as *A. cæruleofasciatus* Stead, and Cockerell 15, as *Tylosurus schismatorhynchus* Bleeker.

Family HEMIRHAMPHIDÆ.

Hyporhamphus intermedius Cantor. Queensland—Castelnau 7, as *Hemirhamphus melanochir* Cuvier & Valenciennes. Cleveland Bay—Klunzinger 49. Brisbane—Castelnau 11.

Hyporhamphus regularis Gunther. Queensland—Kent 47, and Cockerell 13.

Hemirhamphus quoyi Cuvier & Valenciennes. Somerset, Cape York—Gunther 36. Queensland—Cockerell 13. Moreton Bay; Brisbane River—Ogilby 121.

Hemirhamphus welsbyi Ogilby. Moreton Bay—Ogilby 112.

Hemirhamphus far Forskal. Somerset, Cape York—Gunther 36, as *H. commersonii* Cuvier. Cooktown—Kent 47. Thursday Island—Kent 47, and Weber 170.

Hemirhamphus argenteus Bennett. Brisbane River—Castelnau 9, as *H. breviceps*. Moreton Bay—Kent 47.

Hemirhamphus marginatus Forskal. Palm Islands—Alleyne & Macleay 1.

Zenarchopterus dispar Cuvier & Valenciennes. Torres Strait—Ogilby 120.

Arrhamphus sclerolepis Gunther. Tiaro, Mary River—Gunther 36. Port Denison—Klunzinger 49. Brisbane—Macleay 56.

Euleptorhamphus longirostris Cuvier. Wide Bay—Ogilby 121

Family EXOCŒTIDÆ.

Exocœtus volitans Linnæus. Queensland—Kent 47, as *E. volans* Linnæus.

Exocœtus nigripinnis Cuvier & Valenciennes. Queensland, south to Moreton Bay—Kent 47.

Cypselurus melanocercus Ogilby. Moreton Bay—Ogilby 111.

Exonautes oxycephalus Bleeker. Torres Strait - Ogilby 111.

Parexocœtus brachypterus Richardson. Cape York—Gunther 29, as *Exocœtus atrodorsalis*.

Order BERYCOIDEI Family BERYCIDÆ.

Trachichthodes affinis Gunther Moreton Bay—Ogilby 121.

Family TRACHICHTHYIDÆ.

Trachichthys australis Shaw & Nodder. Pimpama Island, Moreton Bay—Ogilby 120.

Hoplostethus elongatus Gunther Moreton Bay—Ogilby 118.

Family MONOCENTRIDÆ.

Cleidopus gloria-maris De Vis Brisbane River—De Vis 153.

Family HOLOCENTRIDÆ.

Holocentrus ruber Forskal. Barrier Reef—Cockerell 15.

Ostichthys australis Castelnau. Cape York—Castelnau 7.

Neomyripristis amænus Castelnau. Nob or Knob Island—Castelnau 6.

Neoniphon armatus Castelnau. Cape York—Castelnau 7.

Neoniphon hasta De Vis. Queensland—De Vis 157.

Order ALLOTRIOGNATHI. Family REGALECIDÆ.

Regalecus glesne Ascanius. Near Tweed River, Queensland—De Vis 163, as *R. mastersii*.

Family TRACHIPTERIDÆ.

Trachipterus jacksoniensis Ramsay. Southport—Marshall 60A.

Order PERCOMORPHI.

Suborder PERCESOCES.

Family ATHERINIDÆ.

Atherina elongata Klunzinger. Queensland—Kent 47 Identification unreliable.

Atherina mugiloides McCulloch. Cape York—De Vis 158, as *Atherinichthys punctatus.*

Hepsetia pinguis Lacepede. Cape York ? - Alleyne & Macleay 1, as *Atherina lacunosa.* Moreton Bay—Ogilby 118.

Hepsetia lacunosa Forskal. Bulwer, Moreton Bay—Ogilby 118.

Craterocephalus fluviatilis McCulloch. McIntyre River—McCulloch 65.

Craterocephalus stercus-muscarum Gunther. Cape York—Gunther 29. Lillesmere Lagoon, Burdekin River—Macleay 58. Cairns; Townsville; Eidsvold, Burnett River; Brisbane—McCulloch 65, as *C. maculatus* Macleay.

Craterocephalus sp. Weber. Burnett River—Weber 170.

Craterocephalus ? honoriæ Ogilby. Nerang Creek - Ogilby 118.

Family MELANOTÆNIIDÆ.

Rhadinocentrus ornatus Regan. Moreton Island—Regan 140. Cowan Cowan, Moreton Bay—Ogilby 125, and Messmer, Qld. Nat. iv. 5, 1924, p. 95.

Pseudomugil signifer Kner. Cape York—Gunther 29, as *Atherina signata.* Bremer River, tributary of Brisbane River—Macleay 59, as *Atherinosoma jamesoni.* Rivers of South Queensland—Cooling 16.

Melanotænia nigrans Richardson. Tiaro, Mary River; 27° 9′ S. lat. 144° E. long.—Gunther 36, as *Atherinichthys nigrans.* Fitzroy River, Rockhampton—Steindachner 146, as *Strabo nigrofasciatus* Kner & Steindachner. Rockhampton; Brisbane; Port Denison; Cape York—Gunther 29, as *Nematocentris nigra.* Gulf of Carpentaria—Castelnau 7, as *Aida inornata.* Fitzroy River, Rockhampton—Castelnau 10, as *Aristeus fitzroyensis.* Rivers of North Queensland—Macleay 55, as *Aristeus rufescens.* Palmer River—Macleay 57, as *Aristeus cavifrons.* Maryborough—De Vis 157, as *Aristeus perporosus.* Cairns—Macleay 60, as *Aristeus rufescens* Macleay. Burnett River—Weber 170, as *Aida inornata* Castelnau. Brisbane; Rockhampton—Cooling 16, as *Rhombatractus fitzroyensis* Castelnau. Upper Noosa River—Ogilby 125, as *M. fitzroyensis* Castelnau. Barron River—Ogilby 122, as *M. maccullochi.*

Family MUGILIDÆ.

Mugil cephalus Linnæus. Tiaro, Mary River—Gunther 36, as *M. cephalotus* Cuvier & Valenciennes. Norman River—Castelnau 10, as *M. dobula.* Brisbane—Macleay 56, as *M. grandis* Castelnau. Burdekin and Mary Rivers—Macleay 58. Moreton Bay to Cooktown—Kent 47. Mary River—Ogilby 104, as *M. oeur.* Moreton Bay—Tosh 152.

Mugil delicatus Alleyne & Macleay. Cape York—Alleyne and Macleay 1. Cape Grenville—Macleay 56.

Mugil marginalis De Vis. Brisbane—De Vis 158.

Mugil convexus De Vis. Cardwell—De Vis 158.

Mugil georgii Ogilby. Moreton Bay—Tosh 152. Brisbane River—McCulloch 79.

Mugil dussumieri (Cuvier & Valenciennes) Day. Gold Island, Rockingham Bay—Ogilby 111, as *M. stevensi*

Mugil longimanus Gunther. Cleveland Bay—Steindachner 150, and Klunzinger 49. Brisbane—De Vis 158.

Mugil cunnesius Cuvier & Valenciennes. Burnett River—Weber 170.

Mugil tade Forskal. Cleveland Bay—Klunzinger 49. Brisbane—De Vis 158.

Mugil tadopsis Ogilby. Moreton Bay—Ogilby 111. Burdekin and Endeavour River estuaries—McCulloch 79.

Mugil ramsayi Macleay. Burdekin River—Macleay 58.

Mugil subviridis Cuvier & Valenciennes. Cape York—Gunther 29.

Mugil, Liza, argenteus Quoy & Gaimard. Fitzroy River, near Rockhampton—Macleay 54. Moreton Bay—Tosh 152.

Mugil, Liza, compressa Gunther. Norman River—Castelnau 10. Queensland—Klunzinger 49.

Mugil, Liza, waigiensis Quoy & Gaimard. Somerset, Cape York—Gunther 36. Port Denison—Klunzinger 49 Lower Burdekin River—Macleay 58. Cleveland Bay—Stead 145.

Mugil, Liza, splendens De Vis. Cardwell—De Vis 158.

Mugil, Liza, papillosa Macleay. Moreton Bay—Tosh 152.

Mugil, Liza, planiceps Cuvier & Valenciennes. Jumping Pin, Moreton Bay—Tosh 152.

Squalomugil nasutus De Vis. Cardwell—De Vis 154. Rockingham Bay—Macleay 59.

Trachystoma petardi Castelnau. Nerang River—Tosh 152, as *Liza breviceps*.

Myxus elongatus Gunther. Tiaro, Mary River—Gunther 36. Southern Queensland—Ogilby 104. Moreton Bay—Tosh 152.

Family SPHYRÆNIDÆ.

Sphyræna brachygnathos Bleeker. Moreton Bay—Ogilby 112.

Sphyræna novæ-hollandiæ Gunther. Moreton Bay—Ogilby 120.

Sphyræna obtusata Cuvier & Valenciennes. Moreton Bay—De Vis 155, as *S. strenua*. Moreton Bay—Tosh 152.

Sphyræna langsar Bleeker. Northern Queensland—Kent 47.

Sphyræna dentatus (De Vis) Kent. Moreton Bay—Kent 47. *Nom nud.*

Sphyræna commersonii Cuvier & Valenciennes. Nob or Knob Island—Castelnau 6.

Suborder RHEGNOPTERI. Family POLYNEMIDÆ.

Polynemus specularis De Vis. Brisbane River—De Vis 155. Moreton Bay—Ogilby 117.

Polynemus sheridani Macleay. Mary River—Macleay 59. Burnett River—Kent 47.

Polynemus indicus Shaw. Queensland—Kent 47.

Polynemus macrochir Gunther. Queensland—Kent 47.

Polynemus multiradiatus Gunther. Brisbane River—De Vis 157. Thursday Island—Ogilby 120.

Polynemus, Eleutheronema, tetradactylus Shaw. Cleveland Bay—Klunzinger 49. Lower Burdekin River—Macleay 58. Endeavour River—Kent 47. Queensland 47, as *Polynemus cœcus* Macleay

Series SCOMBRIFORMES. Family SCOMBRIDÆ.

Scomber australasicus Cuvier & Valenciennes. Queensland—Macleay 55. Moreton Bay—Ogilby 121, as *S. japonicus* Houttuyn.

Rastrelliger kanagurta Russell. Queensland—Klunzinger 49.

Scomberomorus commersonii Lacepede. Queensland—Kent 47. Moreton Bay—Ogilby 121.

Scomberomorus semifasciatum Macleay. Lower Burdekin River—Macleay 58.

Scomberomorus guttatus Bloch & Schneider. Moreton Bay—Ogilby 121.

Scomberomorus tigris De Vis. Cape York—De Vis 157.

Gasterochisma melampus Richardson. Moreton Bay—Ogilby 118.

Family THUNNIDÆ.

Thunnus, Thunnus, maccoyi Castelnau. Queensland—Kent 47. Moreton Bay—Ogilby 112, as *Thunnus thynnus* Linnæus.

Grammatorycnus bicarinatus Quoy & Gaimard. Cape Moreton—Ogilby 125.

Family TRICHIURIDÆ.

Trichiurus savala Cuvier & Valenciennes. Moreton Bay—Ogilby 120.

Trichiurus haumela Forskal. Queensland ?—Kent 47. Thursday Island—Ogilby 120.

Family ISTIOPHORIDÆ.

Tetrapturus indicus Cuvier & Valenciennes. Northern Queensland—Ogilby 121.

Series STROMATEIFORMES. Family NOMEIDÆ.

Nomeus gronovii Gmelin. Cowan Cowan, Moreton Bay—Ogilby 125.

Psenes whiteleggii Waite. Cowan Cowan, Moreton Bay—Ogilby 125.

Psenes hilli Ogilby. Cowan Cowan, Moreton Bay—Ogilby 122.

Family CENTROLOPHIDÆ.

Schedophilus maculatus Gunther. Moreton Bay—Ogilby 123.

Series CARANGIFORMES.

Family APOLECTIDÆ.

Apolectus niger Bloch. Cairns; Townsville—Kent 47. Coomera River—Ogilby 125.

Family MENIDÆ.

Mene maculata Bloch & Schneider. Between Cairns and Rockhampton—McCulloch 83.

Family CARANGIDÆ.

Megalaspis cordyla Linnæus. Off Bowen—McCulloch 70.

Decapterus rüsselli Rüppell. Cape York—De Vis 157, as *Caranx ecclipsifer.* Moreton Bay—Ogilby 115. Darnley Island—Ogilby 120. Bustard Bay—McCulloch 70.

Trachurus declivis Jenyns. Cape Moreton—Ogilby 112. Wide Bay—McCulloch 70.

Caranx kalla Cuvier & Valenciennes Queensland coast - De Vis 157, as *Micropteryx queenslandiæ.* North-east of Bowen—McCulloch 70. Coast of middle Queensland—Ogilby 122

Caranx speciosus Forskal. Somerset, Cape York—Gunther 36. Percy Islands—Alleyne & Macleay 1, as *C. edentulus.* Cleveland Bay Klunzinger 49. North Queensland—De Vis 157, as *C. cives.* Moreton Bay; Southport; Darnley Island—Ogilby 122.

Caranx bucculentus Alleyne & Macleay. Cape Grenville—Alleyne & Macleay 1. Moreton Bay—Kent 47, as *C. nobilis* Macleay. Townsville; Pine Peak; off Cape Gloucester; Edgecumbe Bay—Ogilby 122. Off Pine Peak and Bustard Head—McCulloch 70.

Caranx gracilis Ogilby. Darnley Island - Ogilby 122.

Caranx chrysophrys Cuvier & Valenciennes. Bowen, off Pine Peak—Ogilby 122. Off Bustard Head; Wide Bay--McCulloch 70.

Caranx aurochs Ogilby. Edgecumbe Bay; Hervey Bay; Bustard Bay: Pine Peak—Ogilby 122. Off Pine Peak; off Bowen - McCulloch 70.

Caranx ignobilis Forskal. Cleveland Bay—Klunzinger 49. Cape York—McCulloch 70.

Caranx altissimus Jordan & Seale. Southern Queensland—McCulloch 70.

Caranx parasitus Garman. Cairns—Garman 20.

Caranx georgianus Cuvier & Valenciennes. Percy Islands—Alleyne & Macleay 1. Lower Burdekin River—Macleay 58. Moreton Bay—McCulloch 70.

Caranx leptolepis Cuvier & Valenciennes. Cape York—De Vis 157, as C. *procaranx.* North-west of Pine Peak—McCulloch 70. Cape York—McCulloch 87.

Caranx forsteri Cuvier & Valenciennes Torres Strait—Richardson 143, as C. *parapistes.* Cape York—Alleyne & Macleay 1, as *C. hippos* Linnæus. Cleveland Bay—Klunzinger 49, as *C. hippus* Linnæus. Moreton Bay—Ogilby 121.

Caranx malam Bleeker. Off Double Island Point; off Pine Peak—McCulloch 70.

Caranx armatus Forskal. Somerset, Cape York—Gunther 36. Cape York—Alleyne & Macleay 1. Endeavour River—Klunzinger 49.

Caranx humerosus McCulloch. Off Pine Peak; Bustard Bay; near Bowen—McCulloch 70.

Caranx radiatus Macleay. Rockingham Bay—Macleay 55. Lower Burdekin River—Macleay 58, as *C. compressus* Macleay. Barrier Reef—Kent 47.

Caranx oblongus Cuvier & Valenciennes. Cairns—De Vis 157, as *C. auriga*. Queensland—Kent 47, as *C. aurifer* (misprint for *auriga*).

Caranx filigera Kent. Queensland—Kent 47. *Nom. nud.*

Caranx valenciennei Castelnau. Nob or Knob Island—Castelnau 6.

Selar boops Cuvier & Valenciennes. Cape York—Castelnau 7, as *Carang gervaisi*.

Alectis indica Rüppell. Queensland—Klunzinger 49, as *Caranx gallus* Linnæus. Endeavour River—Macleay 55. Port Denison and northwards—Kent 47. Off Bowen and Gloucester Head—McCulloch 70. Raine Island; Thursday Island; Burnett River; Bowen—Ogilby 122.

Alectis ciliaris Bloch. Moreton Bay; Edgecumbe Bay—Ogilby 122.

Trachinotus botla Shaw. Cloudy Bay, Percy Islands—Gunther 37, as *T. coppingeri*. South Passage, Moreton Bay—Ogilby 112, as *T. velox*. Moreton Bay—Tosh 152. Coolangatta; Southport; Great Sandy Strait—Ogilby 122.

Trachinotus baillonii Lacepede. Percy Islands—Alleyne & Macleay 1. Murray Island—McCulloch 67.

Trachinotus ovatus Linnæus. Percy Islands—Alleyne & Macleay 1. Cleveland Bay—Klunzinger 49. Somerset, Cape York—Gunther 36. Raine Island; Darnley Island; Moreton Bay—Ogilby 123.

Trachinotus anak Ogilby. Wide Bay district; Great Sandy Strait; off Moreton Bay—Ogilby 113.

Scomberoides sancti-petri Cuvier & Valenciennes. Port Denison—Klunzinger 49.

Scomberoides tooloo Cuvier & Valenciennes. Somerset. Cape York—Gunther 36. Cape York—Alleyne & Macleay 1. Lower Burdekin River—Macleay 58.

Scomberoides maculosus Kent. Queensland—Kent 47. *Nom. nud.*

Scomberoides lysan Forskal. Cape York—Alleyne & Macleay 1. Cleveland Bay—Klunzinger 49. Lower Burdekin River—Macleay 58. Moreton Bay—Kent 47.

Eleria tala Cuvier & Valenciennes. Darnley Island—Ogilby 120.

Seriola grandis Castelnau. Moreton Bay—Kent 47. North Reef—McCulloch 70.

Seriola hippos Gunther. Moreton Bay district—Ogilby 121.

Naucrates ductor Linnæus. Queensland coast—Ogilby 121.

Family LACTARIIDÆ.

Lactarius lactarius Bloch & Schneider. Queensland—Klunzinger 49.

Family POMATOMIDÆ.

Pomatomus saltatrix Linnæus. Queensland—Ogilby 100, as *Temnodon saltator* Bloch. Moreton Bay—Kent 47.

Pomatomus tubulus Kent. Queensland—Kent 47. *Nom. nud.*

Family RACHYCENTRIDÆ.

Rachycentron pondicerrianum Cuvier & Valenciennes. Claremont; Bowen; Port Denison—Kent 47, as *Elacate niger.* Moreton Bay—McCulloch 71.

Family LEIOGNATHIDÆ.

Gazza equuliformis Ruppell. Cape York—De Vis 157.

Leiognathus equula Bloch. Endeavour River—Macleay 55, as *Equula edentula* Bloch. Lower Burdekin River—Macleay 58. Cleveland Bay—Klunzinger 49, as *E. caballa* Cuv. & Val.

Leiognathus splendens Cuvier & Valenciennes. Cleveland Bay—Steindachner 150. Port Dension—Klunzinger 49.

Leiognathus novæ-hollandiæ Steindachner. Townsville; Cleveland Bay—Steindachner 150

Leiognathus spiniceps Kent. Queensland—Kent 47. *Nom. nud.*

Leiognathus simplex De Vis. Cape York—De Vis 157.

Leiognathus lineolatus Rüppell Cape York—De Vis 157

Leiognathus gerreoides Blkr. Cape York—De Vis 157

Leiognathus fasciatus Lacepede. Queensland—Kent 47

Leiognathus decorus De Vis Cape York—De Vis 157.

Leiognathus asinus De Vis. Cape York—De Vis 157

Leiognathus profundus De Vis. Queensland coast—De Vis 157

Leiognathus ovalis De Vis. Cape York—De Vis 157.

Leiognathus nuchalis Schlegel. Queensland—De Vis 157.

Leiognathus dispar De Vis. Cape York—De Vis 157.

Leiognathus argenteus De Vis. Cape York—De Vis 157.

Leiognathus hastatus Ogilby. Cape York—De Vis 157, as *Equula longispina.*

Leiognathus mortoniensis Ogilby. Bulwer, off Moreton Island—Ogilby 118.

Series KURTIFORMES. Family KURTIDÆ.

Kurtus gulliveri Castelnau. Norman River—Castelnau 9.

Series PERCIFORMES. Family PERCIDÆ.

Perca fluviatilis Linnæus. Queensland, introduced—O'Connor 92.

Family APOGONIDÆ.

Apogon savayensis Gunther. Murray Island; Palm Islands; Holbourne Island—McCulloch 80.

Apogon fleurieu Lacepede. Darnley Island—Ogilby 123.

Apogon brevicaudatus Weber. Dunk Island—Ogilby 117, as *A. berthæ*. Wide Bay—Ogilby 118. Near Capricorn Group; Wide Bay—McCulloch 81.

Apogon septemstriatus Gunther. Near Bowen—McCulloch 70.

Apogon ellioti Day. Off Gloucester Head—McCulloch 70.

Apogon fasciatus Shaw. Cape Grenville; ? Darnley Island—Alleyne & Macleay 1. Endeavour River; Darnley Island—Macleay 55, as *A. cooki*.

Apogon fasciatus novemfasciatus Cuvier & Valenciennes. Murray Island—McCulloch 70.

Apogon fasciatus aroubiensis Hombron & Jacquinot. Murray Island—McCulloch 70.

Apogon endekatænia Bleeker. Green Island, Cairns; Dunk Island—Ogilby 112

(**Apogon victoriæ** Gunther. Incorrectly recorded from Queensland by Castelnau 7.)

Apogon quadrifasciatus Cuvier & Valenciennes. Off Moreton Island; Double Island Point; Frazer Island; Hervey Bay; Platypus Bay; near Gloucester Head—McCulloch 70.

Apogon torresiensis Castelnau Cape York—Castelnau 7.

Apogon trimaculatus Cuvier & Valenciennes. Cape York—Castelnau 7. Palm Island—McCulloch 80.

Apogon aterrimus Gunther. Cape York—Gunther 29.

Apogon simplex De Vis Cooktown—De Vis 157.

Apogon rudis De Vis Cardwell—De Vis 157.

Apogon australis Steindachner. Fitzroy River. Rockhampton—Steindachner 146.

Apogon nematacanthus Ogilby. Darnley Island—Ogilby 120.

Apogon guttulatus Alleyne & Macleay. Darnley Island—Alleyne & Macleay 1.

Apogon atripes Ogilby. Sandgate—Ogilby 117, as *A. nigripes*. Off Hervey Bay; off Double Island Point—McCulloch 70.

Fowleria auritus Cuvier & Valenciennes. Dunk Island; Bell's Swamps—Ogilby 112.

Fowleria marmoratus Alleyne & Macleay. Cape Grenville—Alleyne and Macleay 1.

Apogonichthys roseobrunneus Macleay. River in North Queensland—Macleay 55.

Apogonichthys nebulosus Ogilby. Brisbane River—Ogilby 112.

Apogonichthys longicauda De Vis. Queensland—De Vis 157.

Apogonichthys adspersus Castelnau. Rockhampton—Castelnau 9.

Apogonichthys darnleyensis Alleyne & Macleay. Darnley Island—Alleyne & Macleay 1.

Adenapogon roseigaster Ramsay & Ogilby. Brisbane River—Ogilby 112.

Glossamia aprion Richardson. Norman River—Macleay 55, as *Gulliveria fasciata*; and Castelnau 10, as *G. fusca*.

Glossamia gillii Steindachner. Fitzroy River, Rockhampton—Steindachner 146. Burdekin River—Macleay 58. Eidsvold—Ogilby 120. Lillesmere Lagoon and Eidsvold, Burdekin River—McCulloch 75.

Archamia macroptera Kuhl & van Hasselt. Dunk Island—Ogilby 112.

Cheilodipterus quinquelineatus Cuvier and Valenciennes. Cape York—Castelnau 7.

Cheilodipterus macrodon Lacepede. Palm Islands—McCulloch 80.

Family AMBASSIDÆ.

Ambassis agassizi Steindachner. Fitzroy River, Rockhampton—Steindachner 146. South-east Queensland—McCulloch 82.

Ambassis macleayi Castelnau. Norman River—Castelnau 10.

Ambassis elevatus Macleay. Endeavour River—Macleay 55. Burnett River Weber 170, as *A. muelleri*.

Ambassis elongatus Castelnau. Norman River—Castelnau 10.

Ambassis convexus De Vis. Queensland—De Vis 157.

Ambassis pallidus De Vis. Queensland—De Vis 157.

Ambassis nigripinnis De Vis. Brisbane River—De Vis 157.

Ambassis gulliveri Castelnau. Norman River—Castelnau 10.

Ambassis nalua Buchanan. Cape Bowling Green Cockerell 15.

Priopis agrammus Gunther. Cape York—Gunther 29.

Priopis nigripinnis Ogilby. Inland creeks, Moreton district: Kilcoy Creek—Ogilby 115.

Priopis olivaceus Ogilby. Brisbane district—Ogilby 115 and Cooling 16.

Priopis marianus Gunther. Near Tiaro, Mary River—Gunther 36. Thursday Island—Ogilby 120. Moreton Bay—Tosh 152.

Family KUHLIIDÆ.

Kuhlia rupestris Lacepede. Rockingham Bay—Macleay 55, as *Dules haswellii*. Cairns—Macleay 60. Brisbane River—Kent 47.

Kuhlia munda De Vis. Cardwell—De Vis 157, as *Herops munda*. Queensland—De Vis 157, as *Dules humilis*. Queensland—Boulenger 4, as *K. malo* Cuvier & Valenciennes.

Kuhlia produles Kent. Queensland—Kent 47. *Nom. nud.*

Family LATIDÆ.

Lates calcarifer Bloch. Fitzroy River—Gunther 31. Torres Strait ?—Alleyne & Macleay 1, as *Pseudolates cavifrons*. Norman and Fitzroy Rivers—Castelnau 10. Cleveland Bay—Klunzinger 49. Lillesmere Lagoon, Burdekin River—Macleay 58, as *L. darwiniensis*. North of Keppel Bay—Kent 47. Rockhampton; Cooktown—Kent 48.

Psammoperca waigiensis Cuvier & Valenciennes. Endeavour River—Klunzinger 49. Intertropical Queensland—Kent 47. Thursday Island—Weber 170. Hammond Island –Boulenger 4. Torres Strait—McCulloch 67.

Family OLIGORIDÆ.

Oligorus macquariensis Cuvier & Valenciennes. Near Tiaro, Mary River—Gunther 36. Mary River—Ogilby 102. Tully River—De Vis 157, as *Homodemus cavifrons*. Upper Brisbane River—O'Connor 94. Darling River System: Goondiwindi—Kent 47 Condamine River—Cockerell 15

Family MORONIDÆ.

Percalates colonorum Gunther. Cleveland Bay--Klunzinger 49 Pine River—O'Connor 94, and Ogilby 126. Nerang River—Tosh 152

Family EPINEPHELIDÆ.

Plectroplites ambiguus Richardson Queensland, 27° 9′ S. lat, 144° E long—Gunther 36 Condamine River—Cockerell 15 Upper Noosa River—Ogilby 125. Mary River—Ogilby 100, and Zeitz 174 Longreach, Thomson River—Johnston & Bancroft 41 Moreton Bay—Ogilby 121.

Macquaria australasica Cuvier & Valenciennes. Queensland—Kent 47, as *Murrayia guntheri, M. cyprinoides, M. bramoides, and Riverina fluviatilis.*

Acanthistius serratus Cuvier & Valenciennes. Cape Moreton—Ogilby 121. Point Lookout—Ogilby 112

Centrogenys waigiensis Cuvier & Valenciennes. Mabuiag, Torres Strait; Port Molle—Boulenger 4. Cape York, "Challenger" Station 186—Gunther 36.

Plectropomus maculatus Bloch. Cape York—Gunther 29. Fair Cape—Alleyne & Macleay 1. Port Denison—Klunzinger 49.

Plectropomus variegatus Castelnau. Cape York—Castelnau 7

Epinephelus sp. ? Queensland—Kent 47, as *Serranus armatus.*

Epinephelus rubriniger Kent. Queensland—Kent 47. *Nom. nud.*

Epinephelus mysticalis De Vis. Queensland coast—De Vis 157, and Kent 47.

Epinephelus geometricus De Vis Moreton Bay—De Vis 156

Epinephelus subfasciatus De Vis. Cardwell—De Vis 157.

Epinephelus subniger Kent. Queensland—Kent 47. *Nom. nud.*

Epinephelus viridipinnis De Vis. Moreton Bay—De Vis 156.

Epinephelus megachir Richardson Trinity Bay to Cape York--Alleyne & Macleay 1, as *Serranus gilberti*. Torres Strait--Macleay 55.

Epinephelus australis Castelnau. Cape York—Castelnau 7. Darnley Island—Alleyne & Macleay 1.

Epinephelus raymondi Ogilby. Cape Moreton—Ogilby 112.

Epinephelus flavocæruleus Lacepede. Brisbane—De Vis 153, as *Homalogrystes luctuosus.*

Epinephelus flavocæruleus var. **hœdtii** Bleeker. Moreton Bay—Ogilby 118.

Epinephelus gilberti Richardson. Torres Strait—Gunther 21. Cape Grenville—Alleyne & Macleay 1, as *Serranus carinatus*. Port Denison—Klunzinger 49. Cape York—Boulenger 4.

Epinephelus fasciatus Forskal. Near Darnley Island - Gunther 21, as *Serranus marginalis* Bloch Queensland—Kent 47, as *S tsirimenara*. Moreton Bay—Ogilby 121.

Epinephelus merra Bloch. Near Darnley Island—Gunther 21, as *Serranus hexagonatus* Forster. Palm Islands—Alleyne & Macleay 1. Moreton Bay—Ogilby 121.

Epinephelus fuscoguttatus Forster. Hope Islands; Port Denison; Cape York—Gunther 29. Cape Grenville—Alleyne & Macleay 1.

Epinephelus tauvina Forskal. Cape York—Castelnau 7, as *Serranus diacanthus* Cuv. & Val. Long Island, Torres Strait—Alleyne & Macleay, 1 as *S. crapao* Cuv. & Val. Cleveland Bay—Klunzinger 49, as *S. polydontophilus*. Mary River—Macleay 58, as *S. estuarius*. Queensland—Kent 47, as *S. suilexus*. Thursday Island—Weber 170, as *S. pantherinus*. Port Bowen—Boulenger 4. Moreton Bay—Ogilby 117. Noosa Lakes (fresh water)—Ogilby 121.

Epinephelus cæruleopunctatus Bloch. Queensland—McCulloch 80.

Epinephelus sp. ? Great Barrier Reef—Kent 47, as *Serranus outalibi*.

Epinephelus undulatostriatus Peters. Moreton Bay—Ogilby 121.

Epinephelus dämelii Gunther. Moreton Bay—Ogilby 121.

Promicrops lanceolatus Bloch. Cairns district—Macleay 60. Wide Bay district; Frazer's Island; Traveston; Mary River—Ramsay 134, as *Oligorus terræ-reginæ*. Moreton Bay—De Vis 153, as *O. goliath*. Brisbane—Macleay 55. Norman River; Mackay—Kent 47.

Cephalopholis mars De Vis. Cardwell—De Vis 157.

Cephalopholis bœnack Bloch. Queensland—Kent 47, as *Serranus stigmipoma*.

Cephalopholis argus Bloch. Queensland—Kent 47, as *Serranus thyrsites*.

Cromileptes altivelis Cuvier and Valenciennes. Darnley Island; Cairns Reef—Ogilby 120. Moreton Bay—Ogilby 125.

Family SERRANIDÆ.

Gilbertia jamesoni Ogilby. Woody Point and Sandgate, Moreton Bay—Ogilby 112. Port Curtis—McCulloch 66.

Anthias pleurotænia Bleeker. Great Barrier Reef—Ogilby 96.

Callanthias allporti Gunther. Off Cape Moreton—Ogilby 123.

Family RAINFORDIIDÆ.

Rainfordia opercularis McCulloch. Middle Island, Edgecombe Bay—McCulloch 86.

Family PLESIOPIDÆ.

Paraplesiops jolliffei Ogilby. Green Island, Moreton Bay—Ogilby 124.

Paraplesiops poweri Ogilby. Mud Island, Moreton Bay—Ogilby 112.

Pharopteryx nigricans Rüppell. Moreton Bay—Cockerell 15.

Pharopteryx melas Bleeker. Masthead Island—Ogilby 120.

Belonepterygion fasciolatum Ogilby. Moreton Bay—Ogilby 120. Masthead Island —McCulloch 61.

Family PSEUDOCHROMIDÆ

Pseudochromis novæ-hollandiæ Steindachner. Port Denison—Steindachner 149. Queensland—Kent 47, as *Polyacanthus queenslandiæ* Masthead Island McCulloch 69.

Pseudochromis fuscus Muller & Troschel. Murray Island—De Vis 158, as *Onar nebulosum*. Moreton Bay—Ogilby 111, as *P. wildii*

Dampieria longipinnis Ogilby. Bowen—Ogilby 111.

Family PRIACANTHIDÆ.

Priacanthus macracanthus Cuvier & Valenciennes. Nob or Knob Island—Castelnau 6, as *P. bleekeri*. Moreton Bay—Tosh 152.

Priacanthus junonis De Vis. Queensland coast—De Vis 157.

Family PEMPHERIDÆ

Liopempheris multiradiatus Klunzinger. Queensland—Cockerell 13.

Leptobrama mulleri Steindachner. Queensland—Steindachner 148. Rockingham Bay—Macleay 55, as *Neopempheris ramsayi*. Keppel Bay; Moreton Bay—Ogilby 120.

Family DIPLOPRIONIDÆ.

Diploprion bifasciatum van Hasselt. Queensland—Kent 47.

Family LOBOTIDÆ.

Lobotes surinamensis Bloch. Endeavour River—Macleay 55, as *L. auctorum* Gunther var. *somnolentus*.

Family GLAUCOSOMIDÆ.

Glaucosoma scapulare Ramsay. Queensland—Kent 47. Moreton Bay—Ogilby 121.

Glaucosoma magnificum Ogilby. Thursday Island Ogilby 122.

Family LUTIANIDÆ.

Aprion virescens Cuvier & Valenciennes. Gardner Bank, east of Frazer Island—McCulloch 70.

Aprion microlepis Bleeker. Moreton Bay—Ogilby 123.

Lutianus argentimaculatus Forskal. Cape York—Steindachner 147, as *Mesoprion sambra* Cuv. & Val. Cleveland Bay—Klunzinger 49.

Lutianus russelli Bleeker. North Reef, Moreton Bay—McCulloch 70.

Lutianus fulviflamma Forskal. Port Denison—Klunzinger 49. North Reef—McCulloch 70.

Lutianus sebæ Cuvier & Valenciennes. Percy Islands—Alleyne & Macleay 1. North of Port Denison—Kent 47. Jew Shoal—Ogilby 121.

Lutianus kasmira Forskal. Queensland—Kent 47, as *Genyoroge bengalensis.* Moreton Bay and northward—Ogilby 121.

Lutianus nigricauda De Vis. Queensland coast--De Vis 157.

Lutianus unicolor Alleyne & Macleay. Percy Islands—Alleyne & Macleay 1.

Lutianus regia De Vis. Moreton Bay—De Vis 156.

Lutianus amabilis De Vis. Moreton Bay—De Vis 156. Nor-West Islet—Ogilby 121. North Reef—McCulloch 69.

Lutianus notata var. **sublineata** De Vis. Cardwell—De Vis 157. Queensland--Kent 47, misprinted *sexlineata.*

Lutianus johnii Bloch. Queensland -Castelnau 7. Cleveland Bay; Endeavour River—Klunzinger 49. Moreton Bay—Tosh 152.

Lutianus gibbus Forskal. Torres Group—Ogilby 111.

Lutianus chrysotænia Bleeker. Somerset, Cape York—Gunther 36. Thursday Island—Weber 170. North Reef; Masthead Island—McCulloch 70.

Lutianus carponotatus Richardson. Port Denison Klunzinger 49.

Lutianus vaigiensis Quoy & Gaimard. Cape Grenville Alleyne & Macleay 1.

Lutianus erythropterus Bloch. Off Pine Peak—McCulloch 70.

Lutianus superbus Castelnau. Moreton Bay - Castelnau 9.

Lutianus obscurus Macleay. Endeavour River Macleay 55.

Lutianus roseigaster Macleay. Rockingham Bay—Macleay 55.

Lutianus aurivittatus Kent. Queensland—Kent 47. *Nom. nud.*

Lutianus helenæ Kent. Queensland—Kent 47. *Nom. nud.*

Lutianus unicolor Castelnau. Cape York - Castelnau 7.

Lutianus nematophora Bleeker. Off Hervey Bay—Ogilby 126.

Lutianus vitta Quoy & Gaimard. Moreton Bay and northward—Ogilby 121.

Family POMADASIDÆ.

Cæsio cærulaureus Lacepede. Off Moreton Bay—Ogilby 120.

Cæsio erythrogaster Cuvier & Valenciennes. Fitzroy Island—Alleyne & Macleay 1.

Cæsio chrysozona Kuhl & van Hasselt. Moreton Bay—Ogilby 123.

Plectorhynchus multivittatus Macleay. Queensland—Kent 47. Darnley Island—Ogilby 122.

Plectorhynchus reticulatus Gunther. Cape York—Gunther 29. Moreton Bay—Ogilby 125.

Plectorhynchus pictus Thunberg. Queensland—Klunzinger 49, as *Diagramma punctatum.* Wide Bay—Macleay 58, as *D. labiosum.* Moreton Bay—Tosh 152. Off Double Island Point—McCulloch 72.

Plectorhynchus amabile Kent. Queensland—Kent 47. *Nom. nud.*

Plectorhynchus amicium Kent. Queensland—Kent 47. *Nom. nud.*

Euelatichthys niger Mertens. Queensland—Klunzinger 49, as *Diagramma affine* Gunther. Lower Burdekin River—Macleay 58. Moreton Bay—Ogilby 121.

Euelatichthys crassilabris Alleyne & Macleay. Queensland—Kent 47, as *Diagramma crassilabre.*

Pomadasys hasta Bloch. Cape York—Gunther 21. Cleveland Bay; Endeavour River—Klunzinger 49. North of Rockingham Bay—Kent 47. Moreton Bay—Cockerell 15.

Pomadasys maculatum Bloch. Torres Strait—Gunther 21.

Pomadasys nigrorubrum Kent. Queensland - Kent 47. *Nom. nud.*

Pomadasys variegatum Kent. Queensland—Kent 47. *Nom. nud.*

Scolopsis plebæius De Vis. Queensland—De Vis 157.

Scolopsis margaritifer Cuvier & Valenciennes. Cape Grenville—Alleyne & Macleay 1.

Scolopsis longulus Richardson. Torres Strait—Gunther 21.

Scolopsis personatus Bleeker. Thursday Island—Weber 170.

Scolopsis specularis De Vis. Queensland—De Vis 153.

Scolopsis temporalis Cuvier & Valenciennes. Palm Islands—McCulloch 80.

Family THERAPONIDÆ.

Pelates quadrilineatus Bloch. Queensland—Kent 47, as *Therapon cuvieri.* Moreton Bay—Ogilby 121. North-east of Bustard Head; Bowen—McCulloch 72.

Pelates sexlineatus Quoy & Gaimard. Off Boomerang Hill and Bustard Head—McCulloch 72.

Therapon carbo Kent. Queensland—Kent 47. *Nom. nud.*

Therapon theraps Cuvier & Valenciennes. Palm Islands to Flinders Island—Alleyne & Macleay 1. Rockingham Bay—Macleay 55. Off Gloucester Head—McCulloch 72. Burnett River; Yam Creek, Torres Strait—Ogilby & McCulloch 129.

Therapon puta Cuvier & Valenciennes. Torres Strait—Macleay 55, as *T. trivittatus.* Buchanan. Queensland Coast—De Vis 157, as *Autisthes argenteus.*

Therapon servus Bloch. Somerset, Cape York—Gunther 36. Cape York—Steindachner 147. Port Denison; Endeavour River—Klunzinger 49, as *T. jarbua.* Off Cape Bedford and Bowen—McCulloch 72. Mapoon, Gulf of Carpentaria; Darnley Island; Edgecumbe Bay; Hervey Bay; Great Sandy Strait; Moreton Bay; Brisbane River; Nerang Creek—Ogilby & McCulloch 129.

Therapon percoides Gunther. Queensland—Gunther 26. Queensland (not Port Jackson as recorded by Steindachner 147, as *Datnia fasciata*)—*vide* Gunther, Zool. Record iv, (1867) 1868, p. 159. Fitzroy River—Gunther 29, and Castelnau 7, as *T. terræ-reginæ*. Norman River—Castelnau 10, as *Therapon fasciatus* Castelnau (*nec* Steindachner). Palmer River; Rivers of Gulf of Carpentaria—Macleay 57. Lillesmere Lagoon, Upper Burdekin River—Macleay 58. Queensland—De Vis 157, as *T. spinosior*. Hodgkinson River—Lucas 52. Burnett River—Weber 170. Walsh River—Cockerell 15. Burnett, Walsh, Barron, and Flinders Rivers—Ogilby & McCulloch 129.

Therapon caudavittatus Richardson. Somerset, Cape York—Gunther 36. Long Island, Torres Strait—Alleyne & Macleay 1. Norman River—Castelnau 10. Port Denison—Klunzinger 49. Murray Island—McCulloch 64. Darnley Island; Moreton Bay—Ogilby & McCulloch 129.

Therapon unicolor Gunther. Mosquito Creek, Darling Downs—Gunther 21. Near Tiaro, Mary River; Queensland, 27° 9′ S. lat., 144° E. long.—Gunther 36. Cape York—Steindachner 147, as *Datnia brevispinis*. Fitzroy River, Rockhampton—Gunther 29. Endeavour River—Macleay 55, as *T. truttaceus*. Palmer River—Macleay 57. Mary River—Macleay 58. Lillesmere Lagoon, Burdekin River—Macleay 58, as *T. longulus*. Lake Elphinstone, between Nebo and Suttor Rivers—De Vis 156, as *T. elphinstonensis*. Upper Condamine River—Ogilby 109. Eidsvold—Ogilby & McCulloch 129.

Therapon bidyana Mitchell. Queensland—Kent 47, as *T richardsoni* Castelnau. Moreton Bay—Ogilby 121.

Therapon argenteus Cuvier & Valenciennes. Queensland—De Vis 157, as *T. acutirostris*.

Therapon carbo Ogilby & McCulloch. Gregory River—Ogilby & McCulloch 129. Longreach, Thomson River—Johnston & Bancroft 41 and 42.

Therapon fuliginosus Macleay. Upper Burdekin River—Macleay 58. Tully and Murray Rivers—De Vis 157, as *Hephæstes tulliensis*.

Therapon trimaculatus Macleay. ? York Peninsula—Ogilby & McCulloch 129.

Therapon hillii Castelnau. Taroom, Upper Dawson River—Castelnau 9. Longreach, Thomson River—Johnston & Bancroft 41 and 42. Dawson River; Norman River—Ogilby & McCulloch 129.

Therapon parviceps Macleay. Upper Burdekin River—Macleay 58.

Therapon bancrofti Ogilby & McCulloch. Eureka Creek, Stannary Hills, North Queensland—Ogilby & McCulloch 129

Therapon ater Kent. Queensland—Kent 47. *Nom. nud.*

Therapon cavifrons Kent. Queensland—Kent 47. *Nom nud.*

Therapon maculosus Kent. Queensland—Kent 47. *Nom. nud.*

Helotes sexlineatus Quoy & Gaimard. Thursday Island—Weber 170.

Family LETHRINIDÆ.

Lethrinus glyphodon Gunther. Moreton Bay—Ogilby 121, and Cockerell 15.

Lethrinus imperialis De Vis. Moreton Bay—De Vis 156.

Lethrinus nematacanthus Bleeker. Cape Grenville; Pipon Islands—Alleyne & Macleay 1. Percy Islands—Macleay 55. Moreton Bay—Jordan & Thompson 44, and Tosh 152. Hervey Bay—Ogilby 121.

Lethrinus chrysostomus Richardson. Cape York—Gunther 21. Percy Islands—Alleyne & Macleay 1. Lady Elliott Island—Ogilby 121.

Lethrinus reticulatus Cuvier & Valenciennes. Endeavour River; Port Denison Klunzinger 49.

Lethrinus nebulosus Forskal. Somerset, Cape York—Gunther 36. Moreton Bay—Ogilby 123.

Lethrinus opercularis Cuvier & Valenciennes. Thursday Island—Weber 170

Lethrinus hæmatopterus Temminck & Schlegel. Cape York—Gunther 2, as *L. richardsonii*. Endeavour River—Klunzinger 49.

Lethrinus laticaudus Alleyne & Macleay. Percy Islands—Alleyne & Macleay 1. Cape York; Murray Island—Ogilby 118.

Lethrinus harak Forskal. Darnley Island—Ogilby 120.

Lethrinus rostratus Cuvier & Valenciennes. Wide Bay district--Kent 47

Lethrinus flavescens Kent (= *L. flavescens* Cuv. & Val. ?). Queensland—Kent 47.

Lethrinus lacrymans Kent. Queensland—Kent 47. *Nom. nud.*

Lethrinus margaritifer Kent. Queensland—Kent 47. *Nom. nud.*

Lethrinus regius Kent. Queensland—Kent 47. *Nom. nud.*

Lethrinus viridis Kent. Queensland - Kent 47. *Nom. nud.*

Lethrinus ornatus De Vis (*nec* Bleeker, *nec* Cuvier & Valenciennes). Wide Bay De Vis 157.

Lethrinus mahsenoides Bleeker. Queensland—Kent 47.

Pentapus setosus Cuvier & Valenciennes. Moreton Island—Gunther 21, as *P. paradiseus*. Queensland—Castelnau 7, as *Dentex filifer*. Cape Sidmouth—Alleyne & Macleay 1. Torres Strait—Kent 47. Moreton Bay—Tosh 152. Rock Cod Shoal; Great Sandy Strait; Moreton Bay; Dunk Island—McCulloch 68.

Family NEOLETHRINIDÆ.

Neolethrinus similis Castelnau. Cape York—Castelnau 7.

Family SPARIDÆ.

Pagrosomus auratus Forster. Moreton Island—Gunther 21, as *Pagrus unicolor*. Brisbane—Ogilby 100. Port Denison; Lady Elliott Island—Kent 47. Mackay—Kent 48. Caloundra—Jordan & Thompson 44. Perforated Rock; E.N.E. from Currumbin; Point Danger—Ogilby 121.

Pagrosomus major Schlegel. Port Denison; Thursday Island—Kent 47.

Argyrops spinifer Forskal. Port Denison—Kent 47. Peel Island, Moreton Bay—McCulloch 83. Bustard Head Reef—Ogilby 121.

Sparus sarba Forskal. South Queensland—Kent 47. Moreton Bay—Jordan & Thompson 44. Off Double Island Point—Ogilby 121.

Sparus australis Gunther. Queensland—Klunzinger 49. Near Tiaro, Mary River—Gunther 36. Moreton Bay—Tosh 152.

Sparus berda Forskal. Lower Burdekin River—Macleay 58 as *Chrysophrys hasta.* Inter-tropical Queensland—Kent 47. Caloundra—Ogilby 125.

Family DENTICIDÆ.

Dentex spariformis Ogilby. Off Cape Moreton—Ogilby 114.

Gymnocranius audleyi Ogilby. Off Moreton Bay; off Noosa Head; Hervey Bay; Bunker Group; Rock Cod Reef; Nor-West Islet—Ogilby 123. Moreton Bay—Cockerell 15, as *G. bitorquatus* Ogilby. Off Bustard Head—McCulloch 72.

Nemipterus sp. Ogilby. Queensland—Kent 47, as *Genyoroge rubicauda* De Vis. Somerset—Ogilby 125.

Nemipterus theodorei Ogilby. Caloundra Banks—Ogilby 124.

Nemipterus tæniopterus Cuvier & Valenciennes. Cape Sidmouth—Alleyne & Macleay 1 Off Bustard Head; off Jenny Lind Buoy; off Double Island Point; Moreton Bay—Ogilby 121.

Nemipterus upeneoides Bleeker. Queensland—Klunzinger 49.

Nemipterus aurifilum Ogilby. Off Cape Moreton; Cartwright Point; Low Bluff; Double Island Point; North Reef; Cape Capricorn; Hummocky Island; Pine Peak, Cape Gloucester; Bowen Light—Ogilby 114.

Nemipterus robustus Ogilby. Damlay (? = Darnley) Island—Gunther 21, as *Synagris furcosus.* Palm Islands to Cape Grenville—Alleyne & Macleay 1.

Family GIRELLIDÆ.

Girella tricuspidata Quoy & Gaimard. Murray Island; Queensland—Kent 47, as *G. simplex* Richardson. Moreton Bay—De Vis 155, as *G. carbonaria* and *G. mentalis.* Moreton Bay—Tosh 152.

Family KYPHOSIDÆ.

Kyphosus cinerascens Forskal. Darnley Island—Alleyne & Macleay 1, as *Scorpis vinosa,* and Ogilby 120. St. Crispin Reef, off Port Douglas—McCulloch 78.

Kyphosus sydneyanus Gunther. Moreton Bay—Ogilby 121.

Kyphosus gibsoni Ogilby. Moreton Bay—Ogilby 118.

Family HISTIOPTERIDÆ.

Zanclistius elevatus Ramsay & Ogilby. Southern Queensland—Ogilby 121.

Family ENOPLOSIDÆ.

Enoplosus armatus Shaw. Cairns—De Vis 160, as *E. serotinus.* Moreton Bay—Ogilby 141.

Family GERRIDÆ.

Gerres ? cheverti Alleyne & Macleay. Cape Grenville—Alleyne & Macleay 1.

Gerres ? longicaudus Alleyne & Macleay. Cape Grenville—Alleyne & Macleay 1.

Gerres ? carinatus Alleyne & Macleay. Darnley Island—Alleyne & Macleay 1.

Gerres ? profundus Macleay. Cardwell; Inter-tropical Queensland coast—Kent 47.

Gerres ? oyena Forskal. Queensland coast—Castelnau 7. Queensland—Kent 47, as *G. ovena*.

Gerres ? splendens De Vis. Cardwell—De Vis 157.

Gerres ? philippinus Gunther. Cape York—Gunther 29

Xystæma ovatum Gunther. Queensland—Kent 47. Moreton Bay—Ogilby 100.

Xystæma argyreum Forster. Queensland—Kent 47.

Xystæma abbreviatum Bleeker. Cape Grenville—Alleyne & Macleay 1.

Xystæma punctatum Cuvier & Valenciennes. Cape York—Gunther 21, as *Gerres filamentosus*, and Steindachner 147. Moreton Bay—Kent 47. Queensland—Klunzinger 49 Endeavour River—Macleay 55. Lower Burdekin River—Macleay 58.

Xystæma darnleyense Ogilby. Darnley Island—Ogilby 120.

Gerreomorpha rostrata Alleyne & Macleay. Torres Strait—Alleyne & Macleay 1.

Family MULLIDÆ.

Mulloides auriflamma Forskal. Queensland—Ogilby 112. Hervey Bay—Ogilby 123

Mulloides armatus De Vis. Queensland—De Vis 157.

Pseudupeneus barberinus Lacepede Queensland—Ogilby 112.

Pseudupeneus jeffi Ogilby Brisbane River—Ogilby 112.

Pseudupeneus signatus Gunther. Southport, Moreton Bay—Tosh 152 Off Double Island Point—Ogilby 121.

Pseudupeneus rubriniger De Vis De Vis, 157, gives no locality, but his type in the Queensland Museum is labelled Tully River

Upeneus vittatus Forskal. Endeavour River—Macleay 55.

Upeneus tragula Richardson. Palm Islands—Macleay 55. Moreton Bay—Ogilby 121.

Upeneus roseus Castelnau Cape York—Castelnau 7.

Upeneus malabaricus Cuvier & Valenciennes. Cape Grenville—Alleyne & Macleay 1. Darnley Island—Cockerell 14.

Upeneus filifer Ogilby. Off Cape Gloucester—Ogilby 114.

Upeneichthys porosus Cuvier & Valenciennes. Queensland—Ogilby 112. Off Cape Moreton; off Double Island Point—Ogilby 121.

Family SCIÆNIDÆ.

Sciæna hololepidota antarctica Castelnau. Brisbane—Castelnau 9, as *Corvina aquila* ? Brisbane River—De Vis 157, as *Corvina axillaris*. Moreton Bay—Ogilby 125.

Sciæna soldado Lacepede. Cleveland Bay; Townsville—Steindachner 150, as *Sciæna, Corvina, muelleri.* Queensland—Klunzinger 49, as *S. miles.* Lower Burdekin River—Macleay 58, as *C. argentea.* Dunk Island; Moreton Bay—Ogilby 125.

Sciæna australis Gunther. Tiaro, Mary River—Gunther 36. Burdekin and Mary Rivers—Macleay 59. Brisbane River—De Vis 157, as *C. canina.* Brisbane River—Johnston and Bancroft 41. Moreton Bay—Ogilby 125.

Sciæna albida Cuvier & Valenciennes. Norman River—Castelnau 10.

Sciæna novæ-hollandiæ Steindachner. Brisbane River—De Vis 157, as *Corvina comes.* Logan River, Brisbane River- Ogilby 112, as *Pseudomycterus maccullochi*, and Ogilby 125.

Umbrina mulleri Klunzinger Queensland—Klunzinger 49.

Family OTOLITHIDÆ.

Otolithus argenteus Bleeker. Edgecumbe Bay—Ogilby 125.

Family SILLAGINIDÆ.

Sillago maculata Quoy & Gaimard. No. 4 Island, Howick Group—Alleyne & Macleay 1. Darnley Island ?—Alleyne and Macleay 1, as *S. gracilis.* Endeavour River—Klunzinger 49. Moreton Bay—Kent 47, and Tosh 152.

Sillago ciliata Cuvier & Valenciennes. Somerset, Cape York—Gunther 36. Queensland—Castelnau 7. Percy Islands- Alleyne & Macleay 1. Moreton Bay—Castelnau 9, as *S. terræ-reginæ.* Brisbane—Castelnau 11, as *S. bassensis,* Port Denison; Cleveland Bay Klunzinger 49 Moreton Bay- Kent 47, as *S. bassensis,* and Tosh 151.

Sillago sihama Forskal. Queensland—Macleay 59. Thursday Island—Weber 170.

Sillago auricomis Ogilby. South Hill; Cartwright Point; Low Bluff; Double Island Point; Hervey Bay; Bustard Bay—Ogilby 114. Lady Elliot Island and southwards—Ogilby 121.

Family CEPOLIDÆ.

Cepola australis Ogilby. Moreton Bay—Marshall 60A.

Suborder CIRRHITOIDEI. Family CIRRHITIDÆ.

Dactylophora nigricans Richardson. Queensland—Cockerell 13. This record is almost certainly incorrect.

Cirrhitichthys armatus Castelnau. Nob or Knob Island—Castelnau 6.

Cirrhitichthys polyactis Bleeker. Near Capricorn Group—McCulloch 83.

Family CHIRONEMIDÆ.

Chironemus marmoratus Gunther. Darnley Island—Gunther 22.

Family CHEILODACTYLIDÆ.

Cheilodactylus fuscus Castelnau. Moreton Bay—Ogilby 112.

Cheilodactylus, Goniistius, gibbosus Richardson. Moreton Bay—Kent 48, and Ogilby 123, as *G. vestitus* Castelnau.

Series GADOPSIFORMES. Family GADOPSIDÆ.

Gadopsis marmoratus Richardson. Warwick district and Killarney, Condamine River—Ogilby 120.

Series CAPRIFORMES. Family ANTIGONIIDÆ.

Antigonia rubicunda Ogilby. Off North Reef—Ogilby 114.

Series EPHIPPIFORMES. Family SCORPIDIDÆ

Scorpis lineolatus Kner. Queensland Kent 47, as *S. æquipinnis* Richardson. Off Moreton Bay—Ogilby 112

Atypichthys strigatus Gunther. Off Moreton Bay—Ogilby 112. Off Cape Moreton — McCulloch 72.

Family MONODACTYLIDÆ.

Monodactylus argenteus Linnæus. Brisbane River—Castelnau 9. Endeavour River, Port Denison—Klunzinger 49. Moreton Bay—Kent 47. Off Bowen — McCulloch 72.

Family PLATACIDÆ.

Platax teira Forskal. Cairns—Kent 47. Queensland—Cockerell 14. Moreton Bay — Ogilby 121.

Platax orbicularis Forskal. Cardwell—Castelnau 9, as *P vespertilio* Bloch. Bowen to Thursday Island—Kent 47.

Platax novemaculeatus McCulloch. Off Gloucester Head; Bowen—McCulloch 72.

Family DREPANIDÆ.

Drepane punctata Gmelin. Endeavour Strait; Cape York—Cuvier & Valenciennes 17. Cape York—Alleyne & Macleay 1. Endeavour River; Cleveland Bay—Klunzinger 49 Off Bowen—McCulloch 72. Edgecumbe Bay—Ogilby 121.

Suborder SQUAMIPENNES.

Series TOXOTIFORMES. Family TOXOTIDÆ.

Toxotes chatareus H. Buchanan. Cleveland Bay—Klunzinger 49. Norman River—Cockerell 15.

Toxotes carpentariensis Castelnau. Norman River—Castelnau 10.

Toxotes jaculator Cuvier & Valenciennes. Endeavour River—Macleay 55. Norman River—Kent 47.

Series CHÆTODONTIFORMES. Family SCATOPHAGIDÆ.

Scatophagus multifasciatus Richardson. Cape York—Gunther 22, and Steindachner 147, and Alleyne & Macleay 1. Norman River—Castelnau 10. Port Denison; Cleveland Bay—Klunzinger 49. Lower Burdekin River—Macleay 58.

Scatophagus ætate-varians De Vis. Queensland coast—De Vis 157, and Kent 47.

Scatophagus argus Linnæus. Cape York—Gunther 20. Brisbane River; Norman River; Cardwell—Castelnau 9.

Scatophagus quadratus De Vis. Queensland coast—De Vis 157.

Scatophagus brunneus Kent. Queensland—Kent 47. *Nom. nud.*

Scatophagus chameleon Kent. Queensland—Kent 47. *Nom. nud.*

Scatophagus semistrigatus Kent Queensland—Kent 47. *Nom. nud.*

Family CHÆTODONTIDÆ

Chætodon aureofasciatus Macleay. Holbourne Island—McCulloch 85.

Chætodon setifer Bloch. Cape York—Castelnau 7. Port Denison—McCulloch 85.

Chætodon trifasciatus Park. Cape York—Castelnau 7, as *C. vittatus.*

Chætodon citrinellus Broussonet. Queensland—De Vis 157, as *C nigripes.*

Chætodon lunula Lacepede. Prince of Wales Island—Cuvier & Valenciennes 17. Two Isles, off Cape Bedford - McCulloch 85.

Chætodon rainfordi McCulloch. Holbourne Island—McCulloch 85.

Chætodon falcula Bloch. Queensland—De Vis 157, as *C aurora.*

Chætodon ephippium Cuvier & Valenciennes. Cardwell—De Vis 157. Queensland—Cockerell 14.

Chætodon pelewensis Kner Queensland—De Vis 157, as *C germanus.*

Chætodon flavirostris Gunther. Queensland—Cockerell 14

Chætodon octofasciatus Bloch. Queensland—Cockerell 14

Chætodon kleinii Bloch Murray Island—Ogilby *in lit* Included in a key to Australian species of *Chætodon* by McCulloch 85.

Chætodon vagabundus Linnæus Murray Island, Cairns Reef, off Cooktown—McCulloch 85.

Chætodon lineolatus Cuvier & Valenciennes Whitsunday Islands—McCulloch 85.

Chætodon melanotus Bloch & Schneider. Murray Island—McCulloch 85.

Megaprotodon plebeius Gmelin. Sue Island, Torres Strait—Macleay 55.

Megaprotodon maculiceps Ogilby. Moreton Bay—Ogilby 115

Coradion altivelis McCulloch. Wide Bay—McCulloch 72.

Parachætodon ocellatus Cuvier & Valenciennes. Moreton Bay—De Vis 157, as *Chætodon townleyi*, and Ogilby 112. Off Bustard Head; Bowen; Port Curtis—McCulloch 72.

Microcanthus strigatus Cuvier & Valenciennes. Wide Bay—McCulloch 72.

Chelmon rostratus Linnæus. Cape York—Castelnau 7. Queensland—Cockerell 14.

Chelmon mulleri Klunzinger. Off Bowen—McCulloch 72.

Forcipiger longirostris Broussonet. Cape York—Castelnau 7.

Chelmonops truncatus Kner. Off Double Island Point—Ogilby 123, and McCulloch 72.

Heniochus macrolepidotus Linnæus. Queensland—Ogilby 121.

Heniochus varius Cuvier & Valenciennes. Cape York—Castelnau 7, as *Taurichthys bleekeri.*

Heniochus chrysostomus Cuvier & Valenciennes. Queensland—Cockerell 14.

Holacanthus flavissimus Cuvier & Valenciennes. Queensland coast—De Vis 157, as *H. sphynx.*

Holacanthus bicolor Bloch. Queensland coast—De Vis 157.

Holacanthus sexstriatus Cuvier & Valenciennes. Cape Grenville—Alleyne & Macleay 1. Darnley Island—Ogilby 122.

Holacanthus imperator Bloch Raine Island—Ogilby 122.

Holacanthus semicirculatus Cuvier & Valenciennes Queensland—De Vis 157, and Ogilby 122.

Holacanthus nox Bleeker. Barrier Reef—Ogilby 123.

Holacanthus, Chætodontoplus, duboulayi Gunther Rat Island, Port Curtis; Cape York—McCulloch 66. Hervey Bay—Ogilby 123. Moreton Bay; Port Curtis; Rockingham Bay—Ogilby 122.

Holacanthus, Chætodontoplus, personifer McCulloch. Wide Bay—McCulloch 72. Moreton Bay—Ogilby 122.

Holacanthus, Chætodontoplus, conspicillatus Waite. Capricorn Group—McCulloch 83.

Series ZANCLIFORMES. Family ZANCLIDÆ.

Zanclus canescens Linnæus. Capricorn Group—McCulloch 83.

Series ACANTHURIFORMES. Family ACANTHURIDÆ.

Teuthis triostegus Linnæus. Queensland—Ogilby 123.

Teuthis nigrofuscus Forskal. Dunk Island—Ogilby 112.

Teuthis matoides Cuvier & Valenciennes. Cape York—Castelnau 7, as *Acanthurus annularis.*

Teuthis grammoptilus Richardson. Masthead Island—McCulloch 76.

Teuthis formosus Castelnau. Nob or Knob Island—Castelnau 6.

Teuthis olivaceus Bloch & Schneider. Capricorn Group—McCulloch 83.

Zebrasoma hypselopterum Bleeker. Queensland coast—De Vis 157, as *Naseus strigatus.* Raine Island—Ogilby 122.

Acanthurus unicornis Forskal. Bramble Cay—Alleyne & Macleay 1. Dunk Island; Raine Island; Cape Moreton—Ogilby 122.

Acanthurus annulatus Quoy & Gaimard. Cape Grenville—Alleyne & Macleay 1.

Acanthurus tuberosus Lacepede. Raine Island—Ogilby 122.

Suborder AMPHACANTHI.

Family SIGANIDÆ.

Siganus aurolineatus Ogilby. Somerset—Ogilby 118.

Siganus javus Linnæus. Cape York—Castelnau 7, as *Amphacanthus javanus* Linnæus.

Siganus vermiculatus Cuvier & Valenciennes. Trinity Bay—Alleyne & Macleay 1.

Siganus notostictus Richardson. Darnley Island—Alleyne & Macleay 1.

Siganus fuscescens Houttuyn. Queensland—Klunzinger 49.

Siganus nebulosus Quoy & Gainard. Cape York—Castelnau 7

Siganus doliatus Cuvier. Fair Cape—Alleyne & Macleay 1.

Siganus flavus De Vis. De Vis, 157, gives no locality. Queensland—Kent 47.

Siganus mixtus Kent. Queensland—Kent 47. *Nom. nud.*

Siganus teuthopsis De Vis. Queensland coast—De Vis 157.

Siganus vitticaudus Kent. Queensland—Kent 47. *Nom. nud.*

Siganus gibbosus De Vis. Queensland coast—De Vis 157.

Siganus consobrinus Ogilby. Cape Grenville—Alleyne & Macleay 1, as *Teuthis albopunctata* Schlegel. Moreton Bay—Ogilby 118.

Order HETEROSOMATA.

Family PSETTODIDÆ.

Psettodes erumei Bloch. Endeavour River—Kent 47

Family BOTHIDÆ.

Platophrys pennata Ogilby. Queensland ?—Ogilby 120

Platophrys pantherinus Rüppell. Darnley Island—Ogilby 120. Murray Island; near Cape Flattery—McCulloch 83.

Platophrys polyophthalmus Bleeker. Between Cairns and Rockhampton—McCulloch 83.

(Arnoglossus) bleekeri Macleay. Endeavour River—Macleay 56.

(Arnoglossus) fisoni Ogilby. Caloundra Head; Moreton Bay—Ogilby 106.

Lophonectes gallus Gunther. South Hill; Moreton Bay—Ogilby 118.

Family PARALICHTHYIDÆ.

Neorhombus ocellatus Kent. Queensland—Kent 47. *Nom. nud.*

Pseudorhombus multimaculatus Gunther. Cape York—Steindachner 147. Moreton Bay—Ogilby 112, as *P. novæ-cambriæ.*

Pseudorhombus arsius H. Buchanan. Endeavour River—Klunzinger 49, as *P. russellii* Gray. Moreton Bay—De Vis 153, as *Pleuronectes mortoniensis.* Queensland—Ogilby 118, as *P. polyspilos* Bleeker.

Pseudorhombus tenuirastrum Waite. Queensland—Ogilby 118.

Pseudorhombus anomalus Ogilby. Moreton Bay—Ogilby 118.

Pseudorhombus cartwrighti Ogilby. Moreton Bay—Ogilby 118.

Pseudorhombus elevatus Ogilby. Bulwer, Moreton Bay—Ogilby 118.

Pseudorhombus polyspilus Bleeker. Queensland—Klunzinger 49.

Pseudorhombus sp. Ogilby. Queensland—Kent 47, as *P. multimaculatus* (*vide* Ogilby 100).

Pseudorhombus sp. Ogilby Off Pine Peak; off Cape Gloucester—Ogilby 118.

Family SAMARIDÆ.

Samaris cacatuæ Ogilby. Off Cape Gloucester—Ogilby 114, and McCulloch & Whitley 91.

Family RHOMBOSOLEIDÆ.

Ammotretis ovalis Kent. Queensland—Kent 47. *Nom. nud.*

Family SOLEIDÆ.

Soleichthys heterorhinos Bleeker. Thursday Island—Kent 47.

Aseraggodes macleayana Ramsay Brisbane River, Caloundra—Ogilby 112. Moreton Bay—Ogilby 123

Pardachirus pavoninus Lacepede. Cape York, Cape Grenville—Alleyne & Macleay 1. Raine Island—Ogilby 123.

Pardachirus hedleyi Ogilby. Moreton Bay—Ogilby 123.

Family SYNAPTURIDÆ

Synaptura salinarum Ogilby. Kimberley -Ogilby 115.

Synaptura breviceps Ogilby. Rockhampton—Ogilby 115.

Synaptura craticulus McCulloch Near Bowen—McCulloch 73

Synaptura mulleri Steindachner. Cleveland Bay, Townsville—Steindachner 150.

Synaptura nigra Macleay. Moreton Bay—De Vis 154, as *S. cinereus*

Synaptura selheimi Macleay Palmer River—Macleay 57

Synaptura fitzroyensis De Vis. Fitzroy River—De Vis 153.

Synaptura armata Kent. Queensland—Kent 47. *Nom. nud.*

Synaptura inermis Kent. Queensland—Kent 47 *Nom. nud.*

Æsopia quagga Kaup Brisbane River—Castelnau 11.

Family CYNOGLOSSIDÆ.

Paraplagusia brevirostris Kent. Queensland—Kent 47. *Nom. nud.*

Paraplagusia unicolor Macleay. Queensland—Ogilby 100, and Kent 47.

Rhinoplagusia japonica Schlegel. Endeavour River—Macleay 56, as *Plagusia guttata*. Moreton Bay—De Vis 155, as *P. notata*. Endeavour River; Finches Bay, Cooktown—McCulloch and Whitley 91.

Cynoglossus quadrilineatus Bleeker. Cleveland Bay—Klunzinger 49.

Order CATAPHRACTI.

Series SCORPÆNIFORMES. Family SCORPÆNIDÆ.

Scorpæna cardinalis Richardson Queensland—Kent 47. Moreton Bay—Ogilby 121.

Scorpæna cruenta Richardson. Queensland—Kent 47.

Scorpæna grandisquamis Ogilby. North-west Island —Ogilby 114.

Scorpæna haplodactyla Bleeker. Cape York—Steindachner 147.

Scorpæna bynoensis Richardson Darnley Island—Alleyne & Macleay 1 Port Denison—Klunzinger 49 Dunk Island, Green Island; Murray Island; Mapoon—McCulloch 64.

Scorpæna bellicosa Castelnau. Queensland—Castelnau 7

Scorpænopsis macrochir Ogilby Brisbane River—Ogilby 115

Scorpænopsis palmeri Ogilby. Moreton Bay—Ogilby 115

Sebastes sp. juv Weber Thursday Island Weber 170.

Neosebastes panda Richardson Queensland—Kent 47

Neosebastes incisipinnis Ogilby Cape Moreton, Double Island; Fraser Island—Ogilby 114 Off Double Island Point and Lighthouse, Wide Bay—McCulloch 70.

Scorpænodes guamensis Quoy & Gaimard Endeavour River—Macleay 55, as *Centropogon echinatus* Murray Island—McCulloch 66 Endeavour River—Ogilby 108

Notesthes robusta Gunther. Tiaro, Mary River - Gunther 36. Brisbane River—Castelnau 9 Mary River—Macleay 58 Queensland coast De Vis 157, as *Centropogon nitens.*

Centropogon australis Shaw Dunwich, Moreton Bay De Vis 157, as *Tetraroge hamiltoni.* Queensland coast—De Vis 157, as *T bellona*

Centropogon marmoratus Gunther. Moreton Bay -Gunther 29

Hypodytes vespa Ogilby. Cape Capricorn -Ogilby 114 Platypus Bay, Rat Island, Port Curtis—McCulloch 81.

Apistus carinatus Bloch & Schneider Low Bluff, Double Island Point and Lighthouse; Boomerang Hill, Hervey Bay; Hummocky Island; Pine Peak; Cape Gloucester—Ogilby 114, as *A. macrolepidotus.* East of Fraser Island—McCulloch 70.

Apistus balnearum Ogilby. Metropolitan Baths, Brisbane—Ogilby 115.

Apistops caloundra De Vis. Caloundra ?—De Vis 160.

Liocranium præpositum Ogilby Queensland coast—Ogilby 108. Great Sandy Strait; Port Curtis; Moreton Bay—McCulloch 72.

Liocranium scorpio Ogilby. Cape Capricorn; North-east Island; Hummocky Island—Ogilby 114. Bowen; Capricorn Group—McCulloch 81.

Tetraroge darnleyensis Alleyne & Macleay. Darnley Island—Alleyne & Macleay 1.

Pterois volitans Linnæus. Cape Upstart—Gunther 22. Torres Strait; Endeavour River—Macleay 55. Moreton Bay—Ogilby 121.

Pterois lunulata Schlegel. Mooloolah—Ogilby 112.

Pterois kodipungi Bleeker. Queensland—Ogilby 125.

Pterois miles Bennett. Queensland--Ogilby 125.

Pterois zebra Cuvier & Valenciennes. Queensland—Ogilby 125.

Family APLOACTIDÆ.

Paraploactis trachyderma Bleeker. Moreton Bay—De Vis 157, as *Aploactis lichen*.

Family SYNANCEJIDÆ.

Synanceja horrida Linnæus. Cooktown- Kent 47

Synanceja verrucosa Bloch & Schneider. Murray Island--McCulloch 62.

Minous versicolor Ogilby Cape Gloucester, Platypus Bay; Low Bluff—Ogilby 114.

Inimicus barbatus De Vis. Cape York -De Vis 157. Hummocky Island to Moreton Bay—McCulloch 72

Erosa erosa Langsdorff. Off Double Island Point -Ogilby 114, as *E. iridea*. Capricorn Group—McCulloch 81.

Erosa fratum Ogilby. Moreton Bay—Ogilby 115.

Family PATÆCIDÆ.

Patæcus fronto Richardson. Moreton Bay—De Vis 161.

Series PLATYCEPHALIFORMES Family PLATYCEPHALIDÆ.

Platycephalus indicus Linnæus. Mary River, Somerset Gunther 36 Cape Grenville; Cape York—Alleyne & Macleay 1, as *P. insidiator*. Cleveland Bay—Klunzinger 49.

Platycephalus fuscus Cuvier & Valenciennes. Maryborough—Ogilby 100. Moreton Bay—Ogilby 121.

Platycephalus bassensis Cuvier & Valenciennes. Queensland--Ogilby 121.

Platycephalus staigeri Castelnau. Queensland—Castelnau 7.

Platycephalus arenarius Ramsay & Ogilby. Off Double Island Point; Boomerang Hill; Fraser Island; Wide Bay; Platypus Bay--McCulloch 70.

Platycephalus mortoni Macleay. Lower Burdekin River—Macleay 58.

Platycephalus marmoratus Stead. Outer Caloundra Bank—Ogilby 125.

Insidiator bosschei Bleeker. Palm Islands; Cape Grenville—McCulloch 68.

Insidiator malayanus Bleeker. Murray Island—McCulloch 68.

Insidiator macracanthus Bleeker. Off Bowen—McCulloch 68.

Insidiator tuberculatus Cuvier & Valenciennes. Platypus Bay—McCulloch 68.

Insidiator jugosus McCulloch. Near Bowen; Hummocky Island; off Cape Capricorn; Hervey Bay; Wide Bay—McCulloch 68.

Insidiator harrisii McCulloch. Off Pine Peak; Bowen; Moreton Bay—McCulloch 68.

Insidiator nematophthalmus Gunther. Queensland—Klunzinger 49. North Queensland—Kent 47, as *Platycephalus staigeri.* Off Hervey Bay; Moreton Bay; Murray Island—McCulloch 68

Insidiator parilis McCulloch Queensland—Kent 47, as *Platycephalus japonicus.* Mapoon—McCulloch 68.

Insidiator isacanthus Cuvier & Valenciennes Palm Islands; Cape Grenville—Alleyne & Macleay 1.

Elates thompsoni Jordan & Seale Pine Peak, Cape Gloucester—Ogilby 114, as *Hyalorhynchus pellucidus* Off Bowen—McCulloch 68.

Family HOPLICHTHYIDÆ.

Hoplichthys ogilbyi McCulloch. Off Cape Moreton—McCulloch 68.

Series TRIGLIFORMES. Family TRIGLIDÆ.

Chelidonichthys kumu Lesson & Garnot Moreton Bay Ogilby 121.

Lepidotrigla alata Houttuyn. Queensland—Kent 47, as *Trigla polyommata* Richardson and as *L vergeri* Queensland -Ogilby 100, as *Chelidonichthys kumu* L. & G

Lepidotrigla grandis Ogilby Off Cape Moreton—Ogilby 114.

Lepidotrigla argus Ogilby Between South Hill and Cape Gloucester—Ogilby 114. Moreton Island, Cape Moreton; North Reef; Low Bluff; Cartwright Point—Ogilby 121.

Lepidotrigla calodactyla Ogilby North Reef—Ogilby 114.

Paratrigla umbrosa Ogilby Between Double Island Point and Pine Peak—Ogilby 114.

Series DACTYLOPTERIFORMES. Family DACTYLOPTERIDÆ.

Ebisinus procne Ogilby. Moreton Bay—Ogilby 115.

Dactyloptena orientalis Cuvier & Valenciennes. Endeavour River—Macleay 55.

Dactyloptena papilio Ogilby. Between Cape Moreton and Edgecumbe Bay—Ogilby 114. Off Cape Gloucester; Platypus Bay; Cape Moreton—Ogilby 121.

Order CHROMIDES. Family POMACENTRIDÆ.

Amphiprion polymnus Bloch. Endeavour River; Cooktown—Macleay 56, as *A. clarkii* Bennett.

Amphiprion percula Lacepede. Darnley Island—Alleyne & Macleay 1, and Cockerell 14. Queensland—Kent 47.

Amphiprion bicinctus Rüppell. Queensland—Kent 47.

Amphiprion ruppellii Castelnau. Cape York—Castelnau 7.

Amphiprion bifasciatus Bloch. Darnley Island—Ogilby 120.

Amphiprion papuensis Macleay. Whitsunday Group ; coll. E. H. Rainford (Australian Museum collection).

Premnas gibbosus Castelnau. Cape York—Castelnau 7.

Dascyllus aruanus Linnæus. Queensland—Castelnau 7. Murray Island—McCulloch 66.

Parma polylepis Gunther Moreton Bay—Ogilby 121.

Acanthochromis longicaudus Alleyne & Macleay Cape Grenville—Alleyne & Macleay 1.

Acanthochromis maculosus De Vis Cardwell - De Vis 158.

Acanthochromis brevispinis De Vis Queensland coast—De Vis 158

Daya jerdoni Day Around the Capricorn Group—McCulloch 81.

Daya jerdoni var **fusca** McCulloch. Off Double Island Point , off Cape Capricorn ; off Bustard Head Light ; off Hervey Bay , off Bowen —McCulloch 81

Pomacentrus prosoptænia Bleeker Cardwell—De Vis 158.

Pomacentrus profundus De Vis Barrier Reef—De Vis 158

Pomacentrus apicalis De Vis. Barrier Reef—De Vis 158. Holbourne Island . Port Denison—McCulloch 76.

Pomacentrus frenatus De Vis. Cardwell De Vis 158.

Pomacentrus littoralis Kuhl & van Hasselt. Dove's Island—Gunther 24. Cape York—Castelnau 7. Cape Grenville , Palm Islands—Alleyne & Macleay 1. Endeavour River--Macleay 56.

Pomacentrus obscurus Alleyne & Macleay Queensland--Alleyne & Macleay 1

Pomacentrus tæniurus Bleeker Port Denison—Klunzinger 49.

Pomacentrus trilineatus Cuvier & Valenciennes Port Denison—Klunzinger 49

Pomacentrus nigricans Lacepede Cardwell —De Vis 173, as *P. subniger*.

Pomacentrus modestus Castelnau Gulf of Carpentaria—Castelnau 7.

Pomacentrus chrysurus Broussonet Darnley Island—Alleyne & Macleay 1

Glyphisodon palmeri Ogilby Moreton Bay ; Caloundra : Sweers Island, Gulf of Carpentaria—Ogilby 120. Capricorn Group ; Cape Bedford ; Two Isles ; Masthead Island ; Torres Strait—McCulloch 81

Glyphisodon expansus De Vis Barrier Reef—De Vis 158.

Glyphisodon luteo-caudata Kent Queensland—Kent 47.

Glyphisodon saxatilis Linnæus. Cape York—Castelnau 7, as *G. waigiensis* Cuv. & Val.

Glyphisodon septemfasciatus Cuvier & Valenciennes. Raine Island—Gunther 36.

Glyphisodon bankieri Richardson. Cape Grenville—Alleyne & Macleay 1.

Glyphisodon melanopus Bleeker. Port Denison—Klunzinger 49.

Glyphisodon sordidus Forskal. Raine Island—Gunther 36.

Glyphisodon zonatus Cuvier & Valenciennes. Murray Island—McCulloch 63.

Chromis virescens Ogilby. Hervey Bay—Ogilby 127.

Order PHARYNGOGNATHI. Family CORIDÆ.

Chelio inermis Forskal. Moreton Bay—Ogilby 117.

Coris aygula Lacepede. Northern Queensland—Ogilby 121.

Coris coronata De Vis. Murray Island—De Vis 158.

Coris pallida Macleay Endeavour River—Macleay 56.

Pseudolabrus guntheri Bleeker. Moreton Bay—De Vis 155, as *Labrichthys dux*, and 158, as *L. guntheri* Bleeker ? , *L. cruentatus*, *L. rex*, and *L maculatus*. Barrier Reef—De Vis 158, as *L sexlineatus*. Masthead Island—McCulloch 66.

Pseudolabrus gymnogenis Gunther. Caloundra Banks—Ogilby 112, as *P. nigromarginatus* Macleay. Mooloolah—Ogilby 112 Moreton Bay—McCulloch 66.

Thalliurus melapterus Bloch. Torres Strait—Richardson 143. Endeavour Reef—Gunther 24. Darnley Island—Alleyne & Macleay 1, as *Cheilolabrus magnilabris*

Platyglossus amabilis De Vis. Murray Island—De Vis 158

Platyglossus equinus De Vis Cardwell—De Vis 158.

Platyglossus punctatus De Vis Murray Island—De Vis 158.

Platyglossus immaculatus Macleay. Dunk Island—Ogilby 112.

Platyglossus notopsis Kuhl & van Hasselt. Murray Island—McCulloch 63.

Halichœres nebulosus Cuvier & Valenciennes Masthead Island—McCulloch 61.

Halichœres opercularis Gunther. Masthead Island—McCulloch 61.

Halichœres trimaculatus Quoy & Gaimard. Barrier Reef—De Vis 158, as *Labrichthys nudigena*. Murray Island, Green Island McCulloch 66.

Halichœres scapularis Bennett. Murray Island—De Vis 158, as *Pseudojulis ziczac*.

Labroides bicincta Kent. Lady Elliot Island—Kent 47

Labroides auropinna Kent. Lady Elliot Island—Kent 47.

Pseudojulis murrayensis De Vis Murray Island—De Vis 158.

Pseudojulis maculifer Castelnau. Queensland—Castelnau 7.

Stethojulis strigiventer Bennett. Low Island—Alleyne & Macleay 1.

Stethojulis renardi Bleeker. Green Island; Dunk Island—Ogilby 112.

Stethojulis kalosoma Bleeker. Murray Island—McCulloch 63.

Hinalea axillaris Quoy & Gaimard. Murray Island—McCulloch 63.

Thalassoma lunare Linnæus. Rocky Island; Cape Flattery—Kent 47.

Thalassoma aneitense Gunther. Cato Island—Gunther 24.

Thalassoma ventralis De Vis. Moreton Bay—De Vis 158.

Thalassoma cyanoventor Kent. Rocky Island; Cape Flattery—Kent 47.

Thalassoma janseni Bleeker. Murray Island—McCulloch 63.

Thalassoma dorsale Quoy & Gaimard. Murray Island—McCulloch 63.

Julichthys inornatus De Vis. Barrier Reef—De Vis 158.

Novaculichthys jacksonensis Ramsay & Ogilby. Moreton Bay—Ogilby 123.

Cheilinus oxyrhynchus Bleeker. Cape York—Castlenau 7.

Cheilinus fasciatus Bloch. Turtle Reef; Cape Bedford—Kent 47.

Cheilinus diagrammus Lacepede. Cape Flattery—Gunther 24, as *C. radiatus* Bloch & Schneider.

Cheilinus chlorurus Bloch. Cape York -Castelnau 7, as *C. guttatus* Bleeker.

Epibulus insidiator Pallas. Port Denison; coll. E. H. Rainford (Australian Museum collection).

Family LABRIDÆ.

(Labrus) iris Solander Off Bustard Bay (Solander)--Gunther 24.

Chœrodon venustus De Vis Cape York—Gunther 24, as *Chœrops ommopterus* Richardson Moreton Bay—De Vis 156. Nor-West Islet—Ogilby 121.

Chœrodon cyanostolus Richardson Cape York—Steindachner 147, as *Chœrops ommopterus* Richardson.

Chœrodon australis Castelnau. Cape York Castelnau 7. Moreton Bay—Tosh 152.

Chœrodon lineatus De Vis. Cardwell— De Vis 158.

Chœrodon notatus Alleyne & Macleay. Cape Grenville— Alleyne & Macleay 1.

Chœrodon cyanodus Richardson. Bramble Island; Endeavour Strait -Richardson 143. Cape York—Gunther 24, and Steindachner 147. Cape Grenville—Alleyne & Macleay 1. Endeavour River—Klunzinger 49. Somerset, Cape York- Gunther 36. Moreton Bay—Tosh 152.

Chœrodon albigena De Vis. Cape York— De Vis 158.

Chœrodon macrodon Bleeker. Hope Islands—Gunther 24

Chœrodon cephalotes Castelnau. Cape York -Castelnau 7. Cape Grenville—Alleyne & Macleay 1 Moreton Bay- De Vis 158, as *Chœrops perpulcher*. Port Denison - Kent 47, as *C. hodgkinsoni*.

Chœrodon rubescens Gunther. Cape York -Castelnau 7.

Chœrodon anchorago Bloch. Cardwell—De Vis 158, as *C. graphicus*. Northern Queensland - Ogilby 121.

Chœrodon olivaceus De Vis. Barrier Reef, north-east coast of Queensland; Cardwell, Cape York --De Vis 158, as *C. concolor*, *C. unimaculatus*, and *C. olivaceus*.

Chœrodon frenatus Ogilby. Off Double Island Point—Ogilby 114.

Chœrodon ambiguus Ogilby. Off Double Island Point—Ogilby 114.

Chœrodon monostigma Ogilby. Off Pine Peak; off Cape Gloucester—Ogilby 114.

Xiphocheilus fasciatus Gunther. Cape York—Gunther 28. Adolphus Island—Kent 47.

Achœrodus gouldii Richardson. Brisbane markets—Ogilby 112, as *A. badius*. Moreton Bay—Ogilby 121.

Lepidaplois vulpina Richardson. Moreton Bay—De Vis 156, as *Cossyphus aurifer*.

Lepidaplois perditio Quoy & Gaimard. Minerva Reef (between Queensland and New Caledonia); Saumarez Reefs (Coral Sea)—Gunther 24, as *Cossyphus atrolumbus.* Off Moreton Bay—Ogilby 123.

Lepidaplois mesothorax Schneider. Barrier Reef—Ogilby 123.

Lepidaplois latro De Vis. Moreton Bay—De Vis 158.

Trochocopus sanguinolentus De Vis. Hutchinson Shoal, Cape Moreton—De Vis 155.

Verreo bellis Ramsay & Ogilby. Moreton Bay—Ogilby 121.

Verreo oxycephalus Bleeker. Arkwright Shoal—Ogilby 112, and 121, as *V. unimaculatus* Gunther.

Family ODACIDÆ.

Neoodax nebulosus (De Vis) Kent. Queensland—Kent 47. *Nom. nud.*

Olisthops cyanomelas Richardson. Southport—Ogilby 112.

Family SCARIDÆ.

Scarus cyanotænia Bleeker. Southport—Ogilby 122.

Scarus pyrrhostethus Richardson Dunk Island—McCulloch 63. Moreton Bay—Ogilby 121.

Scarus fasciatus Cuvier & Valenciennes. Cape Grenville Alleyne & Macleay 1, as *Pseudoscarus rivulatus* Cuv. & Val.

Scarus strigipinnis De Vis. Cardwell—De Vis 158.

Scarus fuscus De Vis. Barrier Reef—De Vis 158.

Scarus flavipinnis De Vis. Cape York—De Vis 158.

Scarus flavolineatus Alleyne & Macleay. Cape Grenville Alleyne & Macleay 1.

Scarus nudirostris Alleyne & Macleay. Cape Grenville—Alleyne & Macleay 1.

Scarus obscurus Castelnau. Cape York—Castelnau 7

Scarus richardsonii Castelnau. Cape York—Castelnau 7.

Scarus viridescens Castelnau. Cape York—Macleay 56.

Scarus sp. Tosh. Moreton Bay—Tosh 152.

Family SPARISOMIDÆ.

Scarichthys auritus Kuhl & van Hasselt Murray Island—McCulloch 63.

Order GOBIOIDEA.

Family ELEOTRIDÆ.

Eleotris fuscus Bloch & Schneider. North Queensland—McCulloch & Ogilby 89.

Eleotris planiceps Castelnau. Norman River—Castelnau 10.

Eleotris pallidus Castelnau. Cape York—Castelnau 7.

Eleotris robustus De Vis. Queensland coast—De Vis 157.

Eleotris sulcaticollis Castelnau. Brisbane River—Castelnau 10.

Oxyeleotris lineolatus Steindachner. Fitzroy River, Rockhampton—Steindachner 146. Palmer River—Macleay 57, as *Eleotris planiceps*, and 59, as *E. selheimi*. Rockhampton, Gracemere, and other lagoons—De Vis 160, as *E. crescens*. Dawson and Flinders Rivers—McCulloch & Ogilby 89.

Mogurnda mogurnda Richardson. Queensland—Castelnau 7. Walsh River; Eureka Creek; North Queensland—McCulloch & Ogilby 89.

Mogurnda mogurnda adspersus Castelnau. Rockhampton—Castelnau 10. Near Brisbane—De Vis 157, as *Eleotris mimus*. Queensland coast—De Vis 157, as *E. concolor*. Victoria Park, Brisbane—Ogilby 112. Eidsvold; Bundaberg; 25 miles inland from Cairns—McCulloch & Ogilby 89. Fitzroy River—Cooling 16.

Mogurnda australis Krefft Logan River—Ogilby 123

Philypnodon grandiceps Krefft. Warwick—Palmer 130.

Carassiops klunzingeri Ogilby. Burnett River—Weber 170, as *Eleotris cyprinoides* Cuv. & Val Eidsvold—McCulloch & Ogilby 89.

Carassiops compressus Krefft. Tiaro, Mary River—Gunther 36. River Dunn, Port Denison—Gunther 29. Cape York—Steindachner 147, as *Eleotris brevirostris*. Port Denison—Macleay 55. Near Brisbane—De Vis 157, as *E. humilis*. North-east coast of Queensland—De Vis 157, as *E. cavifrons*. Mary River—Ogilby 103, as *C. brevirostris* Steindachner. Brisbane—Waite 169. Killarney, Condamine River—Ogilby 109, as var. *montanus*.

Carassiops galii Ogilby. Brisbane; Bundaberg—McCulloch & Ogilby 89

Carassiops simplex Castelnau. Norman River—Castelnau 10

Asterropteryx semipunctatus Ruppell. Port Bowen—Gunther 34. Somerset, Cape York—De Vis 157, as *Eleotris cyanostigma* Bleeker.

Butis amboinensis Bleeker Brisbane River—De Vis 157, as *Eleotris longicauda*. Nerang Creek; Logan River; Brisbane River; Pine River; Noosa Creek; Mary River—Ogilby 115.

Ophiocara aporos Bleeker. Port Denison; Cape York—Gunther 29. Lillesmere Lagoon, Burdekin River—Macleay 58, as *Eleotris planiceps*. Burdekin River; Barron River; Ingham; Cairns—McCulloch & Ogilby 89.

Ophiocara darwiniensis Macleay. Port Denison—Klunzinger 49. Rockingham Bay—Macleay 55. Cooktown—McCulloch & Ogilby 89.

Ophiocara macrolepidotus Bloch. Mary River—Gunther 36. Burnett River—Weber 170.

Parioglossus rainfordi McCulloch. Bowen—McCulloch 80.

Valenciennea muralis Cuvier & Valenciennes. Cape York—Gunther 29. Endeavour River—Macleay 55. Darnley Island—Alleyne & Macleay 1, as *Eleotris lineata* Castelnau. Dunk Island—McCulloch & Ogilby 89.

Valenciennea longipinnis Bennett. Low Island—Macleay 55, as *Eleotris tæniura.* Green Island, Cairns—Waite 168. Darnley Island—Ogilby 120. Masthead Island—McCulloch & Ogilby 89.

Valenciennea lineata Castelnau. Cape York—Castelnau 7.

Ptereleotris microlepis Bleeker. Darnley Island—Alleyne & Macleay 1, as *Eleotris elongata.*

Eviota viridis Waite. Murray Island; Cairns Reef; Masthead Island—McCulloch 66. Between Port Curtis and Torres Strait—McCulloch & Ogilby 89.

Family GOBIIDÆ.

Gobius ornatus Rüppell. Somerset, Cape York—Gunther 36. Cape York—Steindachner 147. Darnley Island—Alleyne & Macleay 1. Palmer River—Klunzinger 49. Murray Island, Cairns Reef; Two Isles—McCulloch & Ogilby 89.

Gobius flavescens De Vis. Moreton Bay—De Vis 157.

Gobius pauper De Vis Moreton Bay—De Vis 157.

Gobius princeps De Vis Cape York—De Vis 157.

Gobius watkinsoni De Vis. Moreton Bay—De Vis 157.

Gobius neophytus Gunther. Murray Island—McCulloch 63.

Gobius nigroocellatus Gunther Bowen—Macleay 55.

Gobius voigtii Bleeker. Cape York—Gunther 29.

Gobius microlepidotus Castelnau. Cape York—Castelnau 7.

Gobius platystoma Gunther. Port Mackay—Macleay 55.

Amblygobius bynoensis Richardson. Cape York—Steindachner 147. Cape Grenville—Alleyne & Macleay 1, as *Apocryptes lineatus.* Palm Islands—Macleay 55. Thursday Island—Weber 170.

Amblygobius phalæna Cuvier & Valenciennes Cape York—De Vis 157, as *Gobius annulatus.* Murray Island—McCulloch 62. Darnley Island—Ogilby 120. Two Isles; Masthead Island—McCulloch & Ogilby 89

Exyrias puntang Bleeker. Cape York—De Vis 157, as *Gobius concolor.*

Glossogobius biocellatus Cuvier & Valenciennes Finches Creek, Cooktown—McCulloch & Ogilby 89.

Glossogobius giurus Buchanan. Queensland coast—De Vis 157, as *Eleotris laticeps.* Norman River—Castelnau 10, as *Gobius ? sauroides.*

Bathygobius fuscus Rüppell. Palm Islands—Alleyne & Macleay 1, as *Gobius nigripinnis.* Darnley Island—Alleyne & Macleay 1, as *G. darnleyensis.* Cape York—De Vis 157, as *G. marginalis.* Cooktown to Port Curtis; Masthead Island; Murray Island; Sweers Island, Gulf of Carpentaria—McCulloch & Ogilby 89.

Bathygobius maculatus Castelnau. Queensland—Castelnau 95.

Mugilogobius devisi McCulloch & Ogilby. Moreton Bay—De Vis 157, as *Gobius stigmaticus*.

Rhinogobius nebulosus Forskal. Cape York—Steindachner 147, as *Gobius caninus* Cuv. & Val. Darnley Island—Alleyne & Macleay 1, as *G. criniger* Cuv. & Val. Cape York — De Vis 157, as *G. festivus*. Thursday Island —McCulloch & Ogilby 89.

Rhinogobius leftwichi Ogilby. Great Sandy Strait; Woody Point, Moreton Bay -- Ogilby 115.

Cryptocentrus gobioides Ogilby. Moreton Bay; Great Sandy Strait—Ogilby 115

Zonogobius nuchifasciatus Gunther. Bowen—Macleay 55 Dunk Island, Masthead Island—McCulloch 63, as *Z. semidoliatus* Cuv & Val

Parachæturichthys polynema Bleeker. Somerset—McCulloch & Ogilby 89.

Callogobius hasseltii Bleeker Masthead Island, Cairns Reef; Two Isles—McCulloch & Ogilby 89.

Callogobius sclateri Steindachner. Two Isles—McCulloch & Ogilby 89.

Oxyurichthys cornutus McCulloch & Waite. Cairns—McCulloch & Waite 90.

Chonophorus crassilabris Gunther. Townsville—McCulloch & Ogilby 89

Paragobiodon echinocephalus Ruppell. Endeavour River—Macleay 55, as *Gobius gibbosus* and *G. scabriceps*. Cairns—Garman 20, as *Gobius waitii*. Port Bowen—Gunther 34. Nor-west Islet; Masthead Island—Ogilby 120. Green Island; Murray Island—McCulloch & Ogilby 89.

Gobiodon citrinus Rüppell. Endeavour River—Macleay 55 Murray Island McCulloch & Ogilby 89.

Gobiodon quinquestrigatus Cuvier & Valenciennes Cape York—Gunther 29 Cairns Reef, Cooktown—McCulloch & Ogilby 89

Gobiodon quinquestrigatus ceramensis Bleeker Port Denison—Klunzinger 49 Darnley Island—Macleay 55 Murray Island—McCulloch & Ogilby 89

Gobiodon verticalis Alleyne & Macleay. Eclipse Island; Cape Sidmouth—Castelnau 6, as *Ellerya unicolor*. Endeavour River; Darnley Island--Macleay 55. Thursday Island and southwards—Kent 47, as *Gobius douglasi*. Murray Island; Green Island, Nor-west Islet—McCulloch & Ogilby 89.

Leme mordax De Vis. Murray River—De Vis 155. Ripple Creek, Herbert River, Cooktown--McCulloch & Ogilby 89.

Leme purpurascens De Vis Brisbane River—De Vis 157. Queensland—De Vis 157, as *Amblyopus niger*.

Family PERIOPHTHALMIDÆ.

Periophthalmus koelreuteri argentilineatus Cuvier & Valenciennes. Brisbane River—Castelnau 9. Torres Strait—Macleay 55. Great Barrier Reef—Garman 20. Cooktown; Cape Bedford—McCulloch & Ogilby 89.

Periophthalmodon barbarus Linnæus. Cardwell—Gunther 36. North Queensland—Castelnau 7, as *P. australis*. Cape York--Alleyne & Macleay 1. Norman River—Castelnau 10. Burdekin River; Mary River—Macleay 58. Keppel Bay—Garman 20, as *P. schlosseri* Pallas. Cairns; Cooktown; Cape York—McCulloch & Ogilby 89.

Scartelaos viridis H. Buchanan. Burnett River; Deception Bay; Ross River at Townsville; Brisbane River; Pioneer River; Barron River—McCulloch & Ogilby 89.

Order DISCOCEPHALI. Family ECHENEIDÆ.

Echeneis naucrates Linnæus. Darnley Island; Cape York—Alleyne & Macleay 1. Cardwell—Castelnau 9. Queensland—Klunzinger 49. Above Victoria Bridge, Brisbane River, Nor-West Islet—Ogilby 121.

Order JUGULARES.

Series CALLIONYMIFORMES. Family CALLIONYMIDÆ.

Callionymus calauropomus Richardson. Queensland—De Vis 154, as *C. achates.*

Callionymus macdonaldi Ogilby. Moreton Bay—Ogilby 117.

Callionymus limiceps Ogilby. Moreton Bay—Ogilby 111. Between Hervey Bay and Port Denison—McCulloch 85

Callionymus, Calliurichthys, grossi Ogilby. Moreton Bay Ogilby 115. Cape Moreton—McCulloch 85.

Callionymus, Calliurichthys, japonicus Houttuyn. Off Cape Moreton—Ogilby 114, as *C. affinis.*

Dactylopus dactylopus Cuvier & Valenciennes. Moreton Bay—Ogilby 111. Stradbroke Island; Wynnum—Ogilby 115 Off Hervey Bay—McCulloch 70.

Series PERCOPHIDIFORMES. Family PARAPERCIDÆ.

Parapercis, Parapercis, cylindrica Bloch. Sir Charles Hardy's Island—Gunther 22. Murray Island; Dunk Island; Moreton Bay—Ogilby 115. Darnley Island—Cockerell 14.

Parapercis, Chilias, nebulosa Quoy & Gaimard. Moreton Bay—De Vis 157, as *Percis concinna.* Off Bustard Head; Boomerang Hill; Fraser Island; Double Island Point; mouth of Wide Bay—McCulloch 68.

Parapercis, Chilias, stricticeps De Vis. Southport—De Vis 157. Moreton Bay—Ogilby 115.

Parapercis, Chilias, polyophthalma Cuvier & Valenciennes. Murray Island—McCulloch 63, as *P. hexophthalma* Cuv. & Val.

Parapercis, Chilias, xanthozona Bleeker. Thursday Island—Weber 170.

Parapercis, Neopercis, sp. Tosh. Moreton Bay—Tosh 152.

Family TRICHONOTIDÆ.

Trichonotus blochii Castelnau. Gulf of Carpentaria—Castelnau 7.

Series URANOSCOPIFORMES. Family OPISTHOGNATHIDÆ.

Gnathypops maculatus Alleyne & Macleay. Palm Islands—Alleyne & Macleay 1. Torres Strait—Ramsay 135, as *Batrachus punctulatus.* Dunk Island—Ogilby 126.

Gnathypops inornatus Ramsay & Ogilby. Northern Queensland—Ogilby 121.

Merogymnus eximius Ogilby. Off Moreton Bay—Ogilby 112.

Merogymnus jacksoniensis Macleay. Moreton Bay—O'Connor 93, and Ogilby 126.

Family URANOSCOPIDÆ.

Uranoscopus terræ-reginæ Ogilby. Off Double Island; North Reef; Cape Gloucester—Ogilby 114.

Ichthyoscopus lebeck Bloch & Schneider. Moreton Bay—Ogilby 121.

Family LEPTOSCOPIDÆ.

Crapatalus arenarius McCulloch. Cape Moreton; Point Lookout—Ogilby 118, as *Leptoscopus macropygus* Richardson. Stradbroke Island—McCulloch 71.

Series BLENNIIFORMES.

Family CLINIDÆ.

Lepidoblennius haplodactylus Steindachner. Fitzroy River, Rockhampton—Steindachner 146. Rockhampton—Gunther 29. Moreton Bay; Cape Moreton—McCulloch 71.

Scleropteryx devisi Ogilby Moreton Bay—Ogilby 101.

Tripterygion atrigulare Gunther. Bowen—Macleay 56.

Tripterygion annulatum Ramsay & Ogilby. Moreton Bay—Ogilby 122.

Family BLENNIIDÆ.

Blennius intermedius Ogilby. Darnley Island—Ogilby 122.

Blennius cinereus Castelnau. Queensland - Castelnau 7.

Blennius pardalis Castelnau. Cape York—Castelnau 7.

Petroscirtes lineatus De Vis. Murray Island—De Vis 157.

Petroscirtes japonicus Bleeker. St. Helena, Moreton Bay—De Vis 157, as *Salarias helenæ*. Woody Point; Great Sandy Strait; Moreton Bay—Ogilby 115.

Petroscirtes rotundiceps Macleay. Moreton Bay—De Vis 160, as *Salarias furtivus*. Wide Bay—Ogilby 115.

Petroscirtes anolius Cuvier & Valenciennes. St. Helena, Moreton Bay—De Vis 157, as *Salarias galeatus*. Moreton Bay; Great Sandy Strait—Ogilby 115. Caloundra—McCulloch 74.

Petroscirtes viperidens De Vis. Somerset—De Vis 157.

Petroscirtes lupus De Vis. Moreton Bay—De Vis 160.

Petroscirtes ? decipiens De Vis. Cardwell—De Vis 157.

Petroscirtes ? furcatus De Vis. St. Helena, Moreton Bay—De Vis 157.

Salarias geminatus Alleyne & Macleay. Torres Strait—Alleyne & Macleay 1. Darnley Island—Alleyne & Macleay 1, as *S. cristiceps*. Murray Island—McCulloch & McNeill 88.

Salarias rivulatus Rüppell. Masthead Island ; Murray Island—McCulloch & McNeill 88.

Salarias belemnites De Vis. Queensland coast—De Vis 157.

Salarias fuscus Rüppell. Murray Island ; Masthead Island—McCulloch & McNeill 88.

Salarias fasciatus Bloch. Cape Grenville—Alleyne & Macleay 1. Darnley Island—Alleyne & Macleay 1, as *S. lineolatus.* Cardwell—De Vis 157, as *S. pauper* and *S. sublineatus.* Queensland coast—De Vis 157, as *S. furvus.* Two Isles—McCulloch 86. Murray Island, Dunk Island ; Masthead Island—McCulloch & McNeill 88.

Salarias meleagris Cuvier & Valenciennes Cape York—Steindachner 147. Nepean Island—Alleyne & Macleay 1. Port Denison—Klunzinger 49. Eagle Island ; Two Isles ; Rat Island, Port Curtis, Masthead Island ; Caloundra—McCulloch & McNeill 88.

Salarias irroratus Alleyne & Macleay Low Island Alleyne & Macleay 1 Murray Island—De Vis 157, as *S calvus* Darnley Island—Ogilby 118 Near Cape Bedford—McCulloch & McNeill 88

Salarias dussumieri Cuvier & Valenciennes. Darnley Island--Alleyne & Macleay 1, as *S. auridens,* and Macleay 56, as *S cheverti*

Salarias lineatus Bleeker. Murray Island—McCulloch & McNeill 88.

Salarias crenulatus Weber Masthead Island—McCulloch 86

Cirripectes filamentosus Alleyne & Macleay. Cape York - Alleyne & Macleay 1. Darnley Island—Ogilby 120, as *Salarias alboapicalis.*

Ecsenius mandibularis McCulloch Masthead Island -McCulloch 86.

Family CHÆNOPSIDÆ

Gunnelichthys sp. Weber. Thursday Island Weber 170.

Family OPHIOCLINIDÆ.

Stenophus marmoratus Castelnau. Gulf of Carpentaria—Castelnau 7.

Stenophus obscurus Castelnau Gulf of Carpentaria—Castelnau 7.

Family NOTOGRAPTIDÆ.

Notograptus guttatus Gunther. Cape York—Gunther 29. Queensland—Castelnau 7, as *Blanchardia maculata.* Port Denison—Klunzinger 49.

Series FIERASFERIFORMES. Family FIERASFERIDÆ.

Fierasfer homei Richardson. Trinity Bay—Alleyne & Macleay 1. Torres Strait—Macleay 56.

Fierasfer houlti Ogilby. Off Double Island Point -Ogilby 127.

Series BROTULIFORMES. Family BROTULIDÆ.

Aphyonus gelatinosus Gunther. Between North-east Australia and New Guinea, 1,400 fathoms—Gunther 38.

Dinematichthys mizolepis Gunther. Cape York—Gunther 29.

Typhlonus nasus Gunther. North-east of Australia, 2,440 fathoms—Gunther 38.

Series ZOARCIFORMES. Family CONGROGADIDÆ.

Congrogadus subducens Richardson. Cape York, "Challenger" Station 186—Gunther 36. Cape York—Steindachner 147 Port Denison—Klunzinger 49. Thursday Island—Weber 170

Blennodesmus scapularis Gunther Port Mackay—Gunther 33. Masthead Island—McCulloch 69

Suborder HAPLODOCI Family BATRACHOIDIDÆ.

Pseudobatrachus dubius Shaw. Queensland coast—De Vis 157, as *Thalassophryne cæca*. Cardwell; Moreton Bay—Ogilby 111 Sue Island, Torres Strait—Alleyne & Macleay 1 Cape York, Moreton Bay—Ogilby 111, as *Batrachomœus minor*.

Pseudobatrachus striatus Castelnau Cape York—Castelnau 7.

Pseudobatrachus broadbenti Ogilby Cardwell, Bundaberg—Ogilby 111

Coryzichthys diemensis Le Sueur Cape York, "Challenger" Station 186—Gunther 36. Cape York—Steindachner 147 Cape Grenville, Torres Strait—Alleyne & Macleay 1. Darnley Island—Alleyne & Macleay 1, as *Batrachus dussumieri* ? Cuv. & Val Port Denison—Klunzinger 49. Queensland—De Vis 153, as *Porichthys queenslandiæ* Thursday Island—Weber 170, and Ogilby 111 Moreton Bay Ogilby 111.

Order XENOPTERYGII Family GOBIESOCIDÆ.

Lepadichthys frenatus Waite Nor-west Islet - Ogilby 118

Order PEDICULATI. Family LOPHIIDÆ

Chirolophius laticeps Ogilby Off Cape Moreton—Ogilby 114.

Family ANTENNARIIDÆ.

Tathicarpus mucosus Ogilby. Port Curtis—Ogilby 109. Wide Bay—Ogilby 118.

Tathicarpus butleri Ogilby. Port Curtis—Ogilby 109.

Tathicarpus appeli Ogilby. Wide Bay—Ogilby 127.

Antennarius commersonii Lacepede. Queensland—De Vis 157, as *A. moluccensis* Bleeker.

Antennarius asper Macleay. Darnley Island—Alleyne & Macleay 1, as *A. urophthalmus* Bleeker, and Macleay 55.

Antennarius stigmaticus Ogilby. Moreton Bay—Ogilby 118.

Family OGCOCEPHALIDÆ.

Halieutæa brevicauda Ogilby. Off Cape Moreton—Ogilby 114.

Order PLECTOGNATHI.

Suborder SCLERODERMI. Family TRIACANTHIDÆ.

Triacanthus biaculeatus Bloch. Cape York—Alleyne & Macleay 1. Cardwell—Castelnau 9. Port Denison—Klunzinger 49. Lower Burdekin River—Macleay 58.

Triacanthus falcanalis Ogilby. Brisbane River; Moreton Bay—Ogilby 116.

Family BALISTIDÆ.

Balistes garnoti Castelnau. Nob or Knob Island—Castelnau 6.

Balistes chrysopterus Bloch & Schneider. Murray Island—McCulloch 63.

Balistes capistratus Shaw. Moreton Bay—Ogilby 121.

Abalistes stellaris Bloch & Schneider. Hope Island Gunther 32, as *Balistes stellatus* Lacepede. Queensland—Castelnau 7.

Balistapus aculeatus Linnæus. Torres Strait—Macleay 56.

Balistapus undulatus Bloch & Schneider Cape York—Castelnau 7.

Family MONACANTHIDÆ.

Monacanthus chinensis Bloch. Port Denison—Klunzinger 49 Moreton Bay—Ogilby 121.

Monacanthus megalourus Richardson Moreton Bay—Peters 132.

Monacanthus tomentosus Linnæus. Endeavour River—Macleay 56. Thursday Island—Weber 170.

Monacanthus sp. Kent. Moreton Bay and northwards—Kent 47.

Stephanolepis melanocephalus Bleeker. Murray Island—McCulloch 62.

Chætodermis penicilligerus Cuvier. Cape York—Gunther 32. Queensland—Castelnau 7. Port Denison—Klunzinger 49.

Cantherines melanoides Ogilby. Cape Moreton Ogilby 112.

Cantherines trachylepis Gunther. Moreton Bay—Cockerell 15, and Ogilby 121.

Cantherines granulatus Shaw. Moreton Bay—Ogilby 121.

Cantherines ayraudi Quoy & Gaimard. Moreton Bay—Ogilby 121.

Cantherines brunneus Castelnau. Nob or Knob Island—Castelnau 6. Crispin Reef—McCulloch 76.

Cantherines maynardi Ogilby. Cowan Cowan, Moreton Bay—Ogilby 124. Moreton Bay; Port Curtis; Hervey Bay; Hummocky Island—Ogilby 125.

Oxymonacanthus longirostris Bloch & Schneider. Murray Island—McCulloch 63.

Family PSILOCEPHALIDÆ.

Psilocephalus barbatus Gray. Platypus Bay—Ogilby 123.

Suborder OSTRACODERMI. Family OSTRACIIDÆ.

Ostracion tuberculatum Linnæus. Cape York—Alleyne & Macleay 1, as *O. cubicus* Linnæus. Fair Cape—Macleay 56.

Ostracion, Lactoria, cornuta Linnæus. Queensland; Port Denison—Klunzinger 49. Endeavour River—Macleay 56.

Suborder GYMNODONTES. Family TETRAODONTIDÆ.

Tetraodon immaculatus Bloch & Schneider. Cape York—Gunther 32, as *T. immaculatus* var. *virgata* Richardson.

Tetraodon reticularis Bloch & Schneider. Lower Burdekin River—Macleay 58.

Tetraodon nigropunctatus Bloch & Schneider. Murray Island—McCulloch 63.

Spheroides multistriatus Richardson. Townsville; Caloundra Bank—Ogilby 125.

Spheroides pleurogramma Regan. Moreton Bay—McCulloch 67.

Spheroides inermis Schlegel. Lower Burdekin River—Macleay 58, as *Tetrodon lævigatus* Linnæus. Torres Strait—Macleay 56.

Spheroides spadiceus Richardson. Moreton Bay—Castelnau 12, as *Tetrodon lunaris* Bloch. Queensland—Klunzinger 49.

Spheroides sceleratus Forster. Cape York—Alleyne & Macleay 1.

Spheroides hamiltoni Richardson. Port Denison—Klunzinger 49.

Spheroides perlevis Ogilby. Sandgate, Moreton Bay—Ogilby 112.

Spheroides pleurostictus Gunther. Brisbane River—Castelnau 9, as *Tetrodon bibroni*. Moreton Bay—Macleay 56, as *T bibronii* Cast Port Bowen; Port Mackay—Macleay 56.

Spheroides tuberculiferus Ogilby. Off Bustard Head; off Double Island Point; Moreton Bay—McCulloch 70. Moreton Bay; Wide Bay—Ogilby 118.

Spheroides squamicauda Ogilby. Coast of South Queensland—Ogilby 115.

Spheroides ? staigeri Castelnau Brisbane River—Castelnau 9.

Family CANTHIGASTERIDÆ.

Canthigaster valentini Bleeker. Murray Island—McCulloch 83.

Canthigaster bennettii Bleeker. Murray Island—McCulloch 83.

Canthigaster callisternus Ogilby Southport—Ogilby 118.

Canthigaster cinctus Richardson. Capricorn Group—McCulloch 83.

Family DIODONTIDÆ.

Diodon holacanthus Linnæus. Port Denison—Klunzinger 49.

Dicotylichthys myersi Ogilby. Moreton Bay—Ogilby 115.

Chilomycterus grandoculis Ogilby. Brisbane River; Moreton Bay—Ogilby 115.

BIBLIOGRAPHY.

1. ALLEYNE, H. G. & MACLEAY, W. .. 1877. Proc. Linn. Soc. N.S.Wales, i.
2. BANCROFT, T. L. .. .. .. 1912. Proc. Roy. Soc. Qld., xxiii.
3. Do. .. .. .. 1916. Proc. Roy. Soc. Qld., xxviii.
4. BOULENGER, G. A. .. .. .. 1895. Cat. Fish. Brit. Mus., i.
5. Do. .. .. .. 1911. Zool. Record (1909), xlvi.
6. CASTELNAU, F. DE .. .. .. 1873. Proc. Zool. Soc. Vict., ii.
7. Do. .. .. .. 1875. Res. Fish. Austr. (Vict. Offic. Rec. Philad. Exhib.).
8. Do. .. .. .. 1876. Journ. Zoologie, v.
9. Do. .. .. .. 1878. Proc. Linn. Soc. N.S. Wales, ii.
10. Do. .. .. .. 1878. Proc. Linn. Soc. N.S. Wales, iii.
11. Do. .. .. .. 1879 Proc. Linn. Soc. N.S. Wales, iii.
12. Do .. .. .. 1879. Proc. Linn. Soc. N.S. Wales, iv.
13. COCKERELL, T. D. .. .. .. 1913. Mem. Qld. Mus., ii.
14. Do. .. .. 1915. Mem. Qld. Mus., iii.
15. Do. .. .. .. 1916. Mem. Qld. Mus., v.
16. COOLING, L. E. .. .. .. 1913. Ann. Rept. Comm. Publ. Health Qld.
17. CUVIER, G. & VALENCIENNES, A. .. 1831. Hist. Nat. Poissons, vii.
18. DUNCKER, G. .. .. .. 1909. Faun. S.W. Austr., ii., 15.
19. Do. .. .. .. 1915. Jahrb. Hamburg Wiss. Aust., xxxii.
20. GARMAN, S. .. .. .. 1903. Bull. Mus. Comp. Zool., xxix.
21. GUNTHER, A. .. .. .. 1859. Cat. Fish. Brit. Mus., i.
22. Do. .. .. .. 1860. Cat. Fish. Brit. Mus., ii.
23. Do. .. .. .. 1861. Cat. Fish. Brit. Mus., iii.
24. Do. .. .. .. 1862. Cat. Fish. Brit. Mus., iv.
25. Do. .. .. .. 1864. Cat. Fish. Brit. Mus., v.
26. Do. .. .. .. 1864. Ann. Mag. Nat. Hist., xiv.
27. Do. .. .. .. 1866. Cat. Fish. Brit. Mus., vi.
28. Do. .. .. .. 1867. Proc. Zool. Soc., 1867.
29. Do. .. .. .. 1867. Ann. Mag. Nat. Hist. (3). xx.
30. Do. .. .. .. 1868. Cat. Fish. Brit. Mus., vii.
31. Do. .. .. .. 1870. Proc. Zool. Soc., 1870.
32. Do. .. .. .. 1870. Cat. Fish. Brit. Mus., viii.
33. Do. .. .. .. 1871. Proc. Zool. Soc., 1871.
34. Do. .. .. .. 1877. Fische Sudsee, vi.
35. Do. .. .. .. 1878. Ann. Mag. Nat. Hist. (5), ii.
36. Do. .. .. .. 1880. Report Voy. Challenger, i., 6.
37. Do. .. .. .. 1884. Zool. Alert, Pisces.
38. Do. .. .. .. 1887. Rept. Voy. Challenger, xxii.
39. HASWELL, W. A. .. .. .. 1908. Rec. Austr. Mus., vii., 1.
40. JOHNSTON, T. H. & BANCROFT, M. J. 1915. Proc. Roy. Soc. Tasm., xxvii.
41. Do. .. .. .. 1919. Proc. Linn. Soc. N.S. Wales, lii.
42. Do. .. .. .. 1921. Proc. Roy. Soc. Qld., xxxiii., 10.
43. JORDAN, D. S. & STARKS, E. C. .. 1917. Ann. Carneg. Mus., xi.
44. JORDAN, D. S. & THOMPSON, W. F. 1912. Proc. U.S. Nat. Mus., xli.

45. Kent, W. S. .. .. .. 1891. Oysters and Oyster Fisher. Qld.
46. Do. .. .. .. 1892. Proc. Roy. Soc. Qld., viii.
47. Do. .. .. .. 1893. Gt. Barrier Reef.
48. Do. .. .. .. 1897. Naturalist in Australia.
49. Klunzinger, C. B. .. .. .. 1879. Sitzb. Akad. Wiss. Wien, lxxx., 1.
50. Krefft, G. .. .. .. 1870. Proc. Zool. Soc., 1870.
51. Littlejohn, G. .. .. .. 1883. Proc. Linn. Soc. N.S. Wales, viii.
52. Lucas, A. H. .. .. .. 1895. Proc. Linn. Soc. N.S. Wales (2), ix.
53. Macleay, W. .. .. .. 1879. Proc. Linn. Soc. N.S. Wales, iv.
54. Do. .. .. .. 1880. Proc. Linn. Soc. N.S. Wales, iii.
55. Do. .. .. .. 1881. Proc. Linn. Soc. N.S. Wales, v.
56. Do. .. .. .. 1881. Proc. Linn. Soc. N.S. Wales, vi.
57. Do. .. .. .. 1882. Proc. Linn. Soc. N.S. Wales, vii.
58. Do. .. .. .. 1883. Proc. Linn. Soc. N.S. Wales, viii.
59. Do. .. .. .. 1884. Proc. Linn. Soc. N.S. Wales, ix.
60. Do. .. .. .. 1886. Proc. Linn. Soc. N.S. Wales (2), 1.
60a. Marshall, T. C. .. .. .. 1925. Mem. Qld. Mus. viii., 2.
61. McCulloch, A. R. .. .. 1910. Proc. Linn. Soc. N.S. Wales, xxxv.
62. Do. .. .. .. 1911. Proc. Linn. Soc. N.S. Wales, xxxvi.
63. Do. .. .. .. 1912. Proc. Linn. Soc. N.S. Wales, xxxvi.
64. Do. .. .. .. 1912. Rec. W. Austr. Mus., i., 2.
65. Do. .. .. .. 1912. Proc. Roy. Soc. Qld., xxiv.
66. Do. .. .. .. 1913. Rec. Austr. Mus., ix., 3.
67. Do. .. .. .. 1914. Rec. W. Austr. Mus., i., 3.
68. Do. .. .. .. 1914. Biol. Res. Endeavour, ii., 3.
69. Do. .. .. .. 1915. Mem. Qld. Mus., iii.
70. Do. .. .. .. 1915. Biol. Res. Endeavour, iii., 3.
71. Do. .. .. .. 1915. Proc. Linn. Soc. N.S. Wales, xl., 2.
72. Do. .. .. .. 1916. Biol. Res. Endeavour, iv., 4.
73. Do. .. .. .. 1916. Mem. Qld. Mus., v.
74. Do. .. .. .. 1917. Austr. Zoologist, i., 4.
75. Do. .. .. .. 1917. Rec. Austr. Mus., xi., 7.
76. Do. .. .. .. 1918. Mem. Qld. Mus., vi.
77. Do. .. .. .. 1919. Rec. Austr. Mus., xii., 8.
78. Do. .. .. . 1920. Rec. Austr. Mus., xiii., 2.
79. Do. .. .. .. 1921. Rec. Austr. Mus., xiii., 4.
80. Do. .. .. .. 1921. Proc. Linn. Soc. N.S. Wales, xlvi., 4.
81. Do. .. .. .. 1921. Mem. Qld. Mus., vii.
82. Do. .. .. .. 1921. Austr. Zoologist, ii., 2.
83. Do. .. .. .. 1922. Mem. Qld. Mus., vii.
84. Do. .. .. .. 1922. Austr. Zoologist, ii., 3.
85. Do. .. .. .. 1923. Rec. Austr. Mus., xiv., 1.
86. Do. .. .. .. 1923. Rec. Austr. Mus., xiv., 2.
87. Do. .. .. .. 1924. Mem. Qld. Mus., viii.
88. McCulloch, A. R. & McNeill, F. A. 1918. Rec. Austr. Mus., xii., 2.
89. McCulloch, A. R. & Ogilby, J. D. 1919. Rec. Austr. Mus., xii., 10.
90. McCulloch, A. R. & Waite, E. R. 1918. Rec. S. Austr. Mus., i.
91. McCulloch, A. R. & Whitley, G. P. 1925. Rec. Austr. Mus., xiv., 4

92. O'Connor, D. .. .. .. 1887. Proc. Roy. Soc. Qld., iii.
93. Do. .. .. .. 1888. Proc. Roy. Soc. Qld., iv.
94. Do. .. .. .. 1897. Proc. Roy. Soc. Qld., xii.
95. Ogilby, J. D. .. .. .. 1885. Proc. Linn. Soc. N.S. Wales, x.
96. Do. .. .. .. 1889. Proc. Zool. Soc., 1889.
97. Do. .. .. .. 1889. Proc. Linn. Soc. N.S. Wales (2), iii.
98. Do. .. .. .. 1889. Proc. Linn. Soc. N.S. Wales (2), iv.
99. Do. .. .. .. 1890. Rec. Austr. Mus., i.
100. Do. .. .. .. 1893. Ed. Fish. and Crust. N.S. Wales.
101. Do. .. .. .. 1894. Proc. Linn. Soc. N.S. Wales (2), ix.
102. Do. .. .. .. 1895. Nat. Science, vi., 35.
103. Do. .. .. .. 1897. Proc. Linn. Soc. N.S. Wales, xxi.
104. Do. .. .. .. 1897. Proc. Roy. Soc. Tasm., 1896.
105. Do. .. .. .. 1898. Proc. Linn. Soc. N.S. Wales, xxi.
106. Do. .. .. .. 1898. Proc. Linn. Soc. N.S. Wales, xxiii.
107. Do. .. .. .. 1900. Proc. Roy. Soc. Qld., xxi.
108. Do. .. .. .. 1903. Proc. Roy. Soc. Qld., xviii.
109. Do. .. .. . 1907. Proc. Roy. Soc. Qld., xx.
110. Do. .. .. .. 1908. Qld. Naturalist, i., 3.
111. Do. .. .. .. 1908. Ann. Qld. Mus., No. 9.
112. Do. .. .. .. 1908. Proc. Roy. Soc. Qld., xxi.
113. Do. .. .. .. 1909. Report on a large Fish destructive to Oysters.
114. Do. . .. .. 1910. New Fish, Qld. Coast.
115. Do. .. .. .. 1910. Proc. Roy. Soc. Qld., xxiii.
116. Do. .. .. .. 1911. Proc. Roy. Soc. Qld., xxiii.
117. Do. .. .. .. 1911. Ann. Qld. Mus., No. 10.
118. Do. .. .. .. 1912. Mem. Qld. Mus., i.
119. Do. .. .. .. 1912. Fish. Rept. Qld., 1910-11. Appendix.
120. Do. .. .. .. 1913. Mem. Qld. Mus., ii.
121. Do. .. .. .. 1915 Commerc. Fish. & Fisher. Qld. An Essay.
122. Do. .. .. .. 1915. Mem. Qld. Mus., iii.
123. Do. .. .. .. 1916. Mem. Qld. Mus., v.
124. Do. .. .. .. 1916. Proc. Roy. Soc. Qld., xxviii.
125. Do. .. .. .. 1918. Mem. Qld. Mus., vi.
126. Do. .. .. .. 1920. Mem. Qld. Mus., vii.
127. Do. .. .. .. 1922. Mem. Qld. Mus., vii.
128. Ogilby, J. D. & McCulloch, A. R. 1909. Proc. Roy. Soc. N.S. Wales, xlii.
129. Do. .. .. .. 1916. Mem. Qld. Mus., v.
130. Palmer, E. G. W. .. .. .. 1902. Proc. Linn. Soc. N.S. Wales, xxvi.
131. Paradice, W. E. J. .. .. 1924. Med. Journ. Austr., ii., 25.
132. Peters, W. .. .. .. 1877. Monatsber. Akad. Berlin, 1876.
133. Raff, J. W. .. .. .. 1912. Zool. Res. Endeavour, part iii.
134. Ramsay, E. P. .. .. .. 1880. Proc. Linn. Soc. N.S. Wales, v., 1.
135. Do. .. .. .. 1883. Proc. Linn. Soc. N.S. Wales, viii.
136. Do. .. .. .. 1884. Proc. Linn. Soc. N.S. Wales, vii.
137. Regan, C. T. .. .. .. 1908. Ann. Mag. Nat. Hist. (8), i.
138. Do. .. .. .. 1908. Proc. Zool. Soc., 1908.

139.	Regan, C. T.	1909. Ann. Mag. Nat. Hist. (8), iv.
140.	Do.	1914. Transl. Zool. Soc. (2), xx.
141.	Do.	1917. Ann. Mag. Nat. Hist. (8), xix.
142.	Richardson, J.	1843. Icon. Pisces, v.
143.	Do.	1844. Zool. Voy. Erebus and Terror, ii.
144.	Sauvage, H. E.	1879. Bull. Soc. Philom. Paris (7), iii.
145.	Stead, D. G.	1907. Add. Fish Fauna N.S. Wales, i.
146.	Steindachner, F.	1867. Sitzb. Akad. Wiss. Wien, lv., 1.
147.	Do.	1867. Sitzb. Akad. Wiss. Wien, lvi., 1.
148.	Do.	1878. Sitzb. Akad. Wiss. Wien, lxxviii., 1.
149.	Do.	1879. Sitzb. Akad. Wiss. Wien, lxxx., 1.
150.	Do.	1879. Denks. Akad. Wiss. Wien, xli., 1.
151.	Tosh, J. R.	1903. Proc. Roy. Soc. Qld., xvii.
152.	Do.	1903. Parlmt. Rept. Mar. Dept. Qld., 1902-3.
153.	De Vis, C. W.	1882. Proc. Linn. Soc. N.S. Wales, vii.
154.	Do.	1883. Proc. Linn. Soc. N.S. Wales, vii.
155.	Do.	1883. Proc. Linn. Soc. N.S. Wales, viii.
156.	Do.	1884. Proc. Roy. Soc. Qld., i.
157.	Do.	1884. Proc. Linn. Soc. N.S. Wales, ix.
158.	Do.	1885. Proc. Linn. Soc. N.S. Wales, ix.
159.	Do.	1885. Proc. Roy. Soc. Qld., ii.
160.	Do.	1886. Proc. Roy. Soc. Qld., ii.
161.	Do.	1887. Proc. Roy. Soc. Qld., iii.
162.	Do.	1888. Ann. Rept. Qld. Mus.
163.	Do.	1892. Proc. Roy. Soc. Qld., viii.
164.	Do.	1911. Ann. Qld. Mus., No. 10.
165.	Waite, E. R.	1899. Mem. Austr. Mus., iv.
166.	Do.	1899. Rec. Austr. Mus., iii.
167.	Do.	1900. Rec. Austr. Mus., iii.
168.	Do.	1902. Rec. Austr. Mus., iv.
169.	Do.	1904. Rec. Austr. Mus., v.
170.	Weber, M.	1895. Zool. Forschr. Austr., v.
171.	Do.	1913. Nova Guinea. ix., 4.
172.	Weber, M. & Beaufort, L. F. de	1913. Fish. Indo-Austr. Archip., ii.
173.	Do.	1922. Fish. Indo-Austr. Archip., iv.
174.	Zeitz, A.	1909. Trans. Roy. Soc. S. Austr., xxxiii.

Anthony James Cumming, Government Printer, Brisbane.

A GIANT DINOSAUR FROM DURHAM DOWNS QUEENSLAND.

By Heber A. Longman, Director.

(Plates XXIX.-XXXIII.)

Introduction.—In February, 1924, Mr. Thomas Jack, of Dalby, and Mr. M. C. Wood, of Brisbane, informed me that a very large fossil was exposed on Durham Downs Station in the Roma District. As the result of correspondence, Mr. A. J. Browne, manager, forwarded fragments of vertebræ which were at once recognised as new to our collection. Subsequently Mr. Browne made arrangements to collect the whole of the remaining series as exposed in sandstone rock, amounting to about four cwt. of material. The specimens were packed in seven cases, and sent by motor lorry to Roma, and railed to Brisbane, where they were received at the Queensland Museum in May, 1925.

It is my pleasant duty very heartily to thank Mr. Browne for his great kindness in collecting, packing, and forwarding as a donation this valuable material.

Locality.—In response to my request Mr. Browne states that the exact location is as follows:—"About one-quarter of a mile on the south side of Eurombah Creek on Grazing Farm 1352A, Roma district, being portion 1v, parish of Narran, county of Aberdeen. The fossil is located in the north west corner of the selection." Eurombah Creek is a tributary of the Dawson River.

Horizon.—Walloon Series, Jurassic, Freshwater. H. I. Jensen refers to the Durham Downs country as the "Lower Walloon or calcareous Walloon." He says that there is evidence of "a continued sweep of Lower Walloon strata from Taroom S.W. to Durham Downs, then W.N.W. to Boggarella."[1] In 1915, B. Dunstan, in his introduction to A. B. Walkom's study of our Mesozoic Floras, placed the Walloon Series as Jurassic, Freshwater, discarding the old term "Trias-Jura" as used by most earlier writers.[2] In a later paper[3] A. B. Walkom lists thirty-seven species from the Walloon Series and its equivalents, and states: "There is no doubt that the age of this flora is Lower Jurassic."

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[1] H. I. Jensen, Qld. Govt. Mining Jr., xxii., Oct. 1921, p. 403.

[2] B. Dunstan, Qld. Geol. Surv., Pub. No. 252, 1915, pp. 1-4.

[3] A. B. Walkom, Proc. Roy. Soc. Qld., xxxi, 1919, p. 15.

In 1923, H. I. Jensen states: "The Walloon Formations north of Roma have yielded no *Thinnfeldia,* and no large Tæniopteridæ. *Cladophlebis australis, Tæniopteris spatulata, Otozamites Feistmanteli,* and *Sphenopteris superba* were the principal fossils found in the Walloon in this area, the only others being fragments of Neocalamites and other Equisetales, *Ptilophyllum pecten, Dictyophyllum Davidi,* and seeds and spores. The Walloon Formations are Jurassic. . . ."[4]

The thickness of the Walloon Formations in the Roma district, as divided by Jensen (loc. cit , p. 157), is estimated at 5,000 ft. The Walloon Series and its equivalents are discussed by Bryan and Massey in a more recent paper.[5]

Material.—Over 100 specimens were forwarded, some of which are small shattered pieces. The main part consists of a series of twenty-two vertebræ, the majority of which were fractured, especially in the region of the neural arches. Owing to prolonged exposure some of the centra are much abraded on one side There are also fragments representing central portions of the shafts of a femur, tibia, and fibula. In addition there are many smaller remains of pelvic elements, most of which are shattered into tiny pieces.

Matrix.--Mr. L. C. Ball, B E., Deputy Chief Government Geologist, defines the matrix as "a very fine-grained, ferruginous, and highly calcareous sandstone, with attached masses of oxidised concretionary clay ironstone."

Great difficulty has been experienced in exposing the natural contours that were covered by matrix. In places the matrix forms a closely investing cement, much harder and less friable than the bone, and which, to use a mining term, is "frozen" to the surface of the specimens.

Previous Records.—This Durham Downs fossil is the first consequential discovery of a large Dinosaur in Australia, but there are three previous records of fragments. In 1891 H. G. Seeley described[6] *Agrosaurus Macgillivrayi,* "a Saurischian reptile from the N.E. Coast of Australia," believed to have been collected by Macgillivray during the voyage of the "Fly" from "some locality which was then unnamed," attributed doubtfully to the Trias. In 1906 A. Smith Woodward described and figured an "ungual phalange of a carnivorous Dinosaur," from the Lower Jurassic, Cape Patterson, Victoria, which was compared with *Megalosaurus* but unnamed.[7] The same author in 1909 recorded a "tooth and a posterior caudal vertebra of a small Megalosaurian" from "the Upper Cretaceous opal-bearing sandstone of Lightning Ridge, near Walgett, New South Wales."[8]

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[4] H. I. Jensen, Proc. Linn. Soc. N.S.W., xlviii., 1923, p. 154.

[5] W. H. Bryan and C. H. Massey, Proc. Roy. Soc. Qld., xxxvii., 1925, p. 117.

[6] H. G. Seeley, Quart. Jr. Geol. Soc., vol. 47, 1891, p. 164.

[7] A. Smith Woodward, Ann. Mag. Nat. Hist. (7), vol. 18, 1906, p. 3.

[8] A. Smith Woodward, Rep. Brit. Assn., 1909, p. 482.

As will be seen from the descriptions, the Durham Downs specimens cannot be associated, for fairly obvious reasons, with the claw of a carnivorous Dinosaur from Victoria, and still less with the other two records.

Many comparisons have been made between our material and descriptions of Dinosaurs from other parts of the world, and, apart from the special significance of this discovery in Queensland, it is believed that the caudal vertebræ exhibit distinctive characters which require generic recognition. It may be remarked that Owen repeatedly pointed out the importance of vertebral characters,[9] and caudal vertebræ have been occasionally used for new generic and specific determinations. It is hoped, however, that additional remains, including cranial material, will be available later in order that other characteristics of this gigantic reptile may be made known.

Incidentally it may be mentioned that Leidy's genus *Antrodemus* was founded on the posterior half of a caudal centrum, with which C. W. Gilmore in 1920 associated *Allosaurus fragilis*.

RHŒTOSAURUS BROWNEI, new genus and species.[10]

Chief Characters.—Caudal vertebræ amphicœlous; anterior ones gigantic; centra solid, with expanded elliptical articulating surfaces, from which the body curves evenly to a median construction, which is more pronounced in the posterior elements, centra somewhat compressed laterally. Prezygapophyses elongated, the articulating surfaces being vertical and not obliquely horizontal (orthozygous) Postzygapophyses absent, but the hyposphene is well developed. Neural spines stout and not greatly elongated; anterior ones subrectangular in lateral outline, and with an oval median recess on the posterior margin above the junction with the hyposphene, which projects somewhat posteriorly; inferior border of hyposphene free, articulating between the prezygapophyses in the hypantrum area and roofing the neural canal. Anterior chevrons massive and not elongated, intervertebral in attachment and partly lateral in position; not confluent at their vertebral attachment; posterior chevrons more inferior in position. Neural canal relatively large in the anterior caudals.

Caudal Vertebræ.—Although many of the vertebræ are in two or more pieces, it has been possible to reconstruct the centra and to place in correct juxtaposition a series of sixteen units. This demonstrates the careful way in which the fragments were collected by Mr. A. J. Browne and his assistants.

The antero-posterior extent of these sixteen consecutive vertebræ is 9 ft., or 2 metres, 743 mm. When photographed this consecutive series was slightly

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[9] "If I were restricted to a single specimen on which to deduce the nature of an extinct animal, I should choose a vertebra to work out a reptile, and a tooth in the case of a mammal."—R. Owen, Ann. Mag. Nat. Hist., ii., 1878, p. 216.

[10] From "Rhœtos," one of the giants in Greek mythology, sprung from the blood of Uranos. The specific name is in honour of Mr. A. J. Browne, of Durham Downs.

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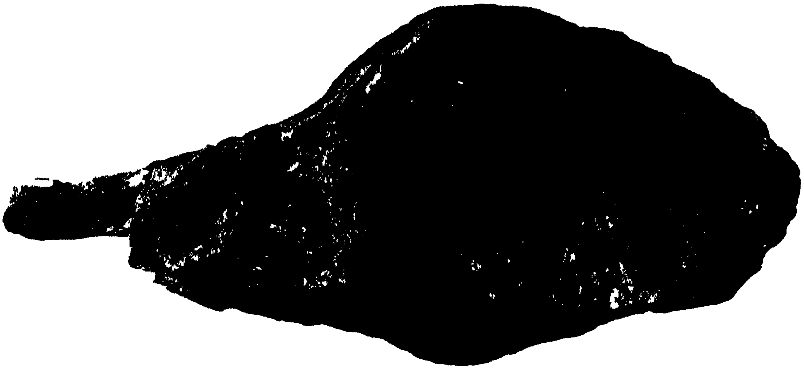

1

Rhaetosaurus brownei Fig 1 —Lateral view of conjoined anterior vertebræ. Fig. 2 —Anterior face of first vertebra.

vertebræ, but it is thought that the total number of caudal vertebræ was about thirty or thirty-five at most. It is assumed that there was no whip-like distal extension as in *Diplodocus.*

The inferior border of the centrum in the anterior vertebræ appears to have been obtusely keeled, but in the median and posterior units of our series it is smoothly rounded. In the lateral outline the inferior border is very concave, especially in the posterior vertebræ.

Chevrons.—On the anterior vertebræ these are somewhat thick, subtriangular plates, which do not appear to have had very elongated processes. The apex of the triangle lies within the groove between the articulating surfaces of the vertebræ, the infero-lateral margins of which diverge to accommodate the expanding plates. In one or two of the anterior vertebræ, the greater part of these sub-triangular bones lies within the plane of the centra, and it seems probable that the area of the hæmal canal must have been relatively small. Some of these chevrons, however, may have been forced upward during the process of fossilisation. The inferior borders of the chevrons are fairly straight, and, although they may be contiguous in the pairs preserved in position, there is no evidence of ankylosis. The contours of the inferior borders do not suggest lengthy inferior blades. In the series as a whole there is evidently considerable variation in the size, contours, and positions of the chevrons, and no one of the posterior elements is well preserved.

On the first two vertebræ the superior margin of the chevrons is obtusely rounded and the shape of the plate is thus more oval than sub-triangular (Plate XXXI., fig. 3). On vertebra No. 10 of our series the conjoined inferior margin of the chevrons is distinctly concave, and, in this respect, resembles those of *Cetiosaurus leedsi*[11] (Plate XXXI., fig. 2). On the posterior vertebræ, the chevrons, which are still sub-triangular, are more inferior in position and are contiguous beneath the centra. Here there is evidence of projections at the posterior angle.

The massive, short chevron plates of the anterior vertebræ with wide areas for intervertebral articulations appear to be very distinctive.

Neural Spines.—With the exception of that on one of the posterior vertebræ (No. 12 in our consecutive series), the neural spines are very imperfect, and it has been found possible to reconstruct only two of the anterior ones. The anterior spines slope backwards at an angle of about 130 degrees from the plane of the centra, and they attain an antero-posterior diameter of about 90 mm. and a transverse diameter of about 40 mm. Although the distal margins are incomplete it is evident that the height of the anterior spines was at least three times the antero-posterior diameter. Unplaced fragments have apices which are truncated or broadly rounded in lateral profile, whilst the more posterior spines are acuminate in transverse profile

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[11] B. M. Guide Foss. Rept. and Fishes, 1905, Plate III.

The spines decrease in height and general bulk towards the end of the series; here they are much more obliquely set, the posterior margin is very concave, and the apex reaches a point above the middle of the subsequent vertebra

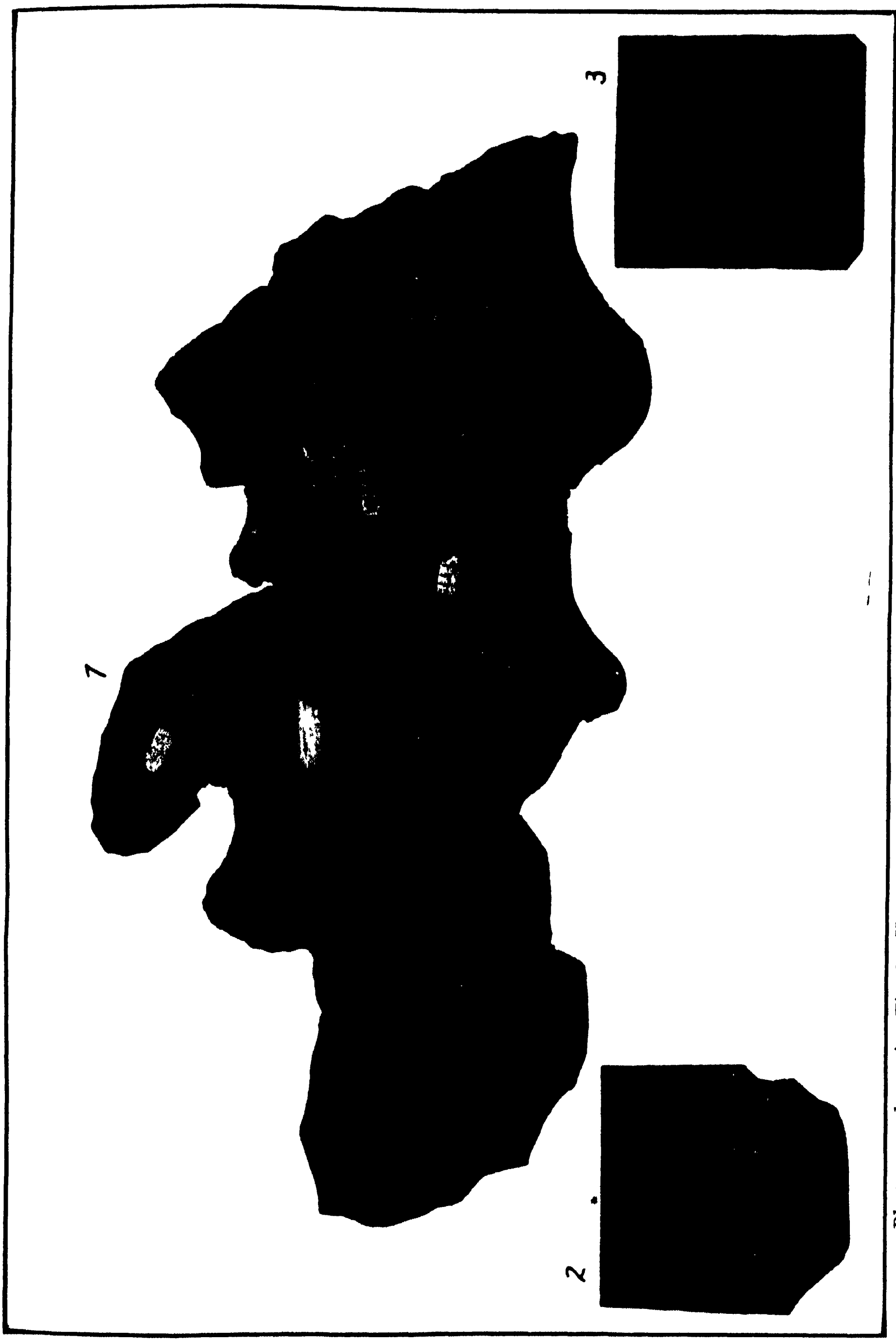
Included among the unplaced fragments are remains of several spines, but as they were obviously broken and abraded long before the fossil was collected it is impossible to place them in correct position. There is no evidence that any of the neural spines were emarginated distally, as in many of the anterior caudals of *Diplodocus.*

Transverse Processes.—Although none of the diapophyses are present, areas of fracture denote that the first six of our consecutive series carried transverse processes. The first vertebra is too much abraded to yield evidence of the extent of the processes. On the second vertebra the transverse processes were situated above the upper third of the centrum (Plate XXX., fig. 1). The fractured area denoted an antero-posterior length of about 70 mm. with a thickness of 30 mm., and the process was angulated posteriorly with a superior buttress. On the third vertebra the area of fracture is slightly lower in position and more oval, and the same applies to No. 4. The area of No. 5 is somewhat obscured; it resembles 4 but is lower in position. The sixth vertebra apparently carried a small transverse process, but there is no positive evidence on the seventh.

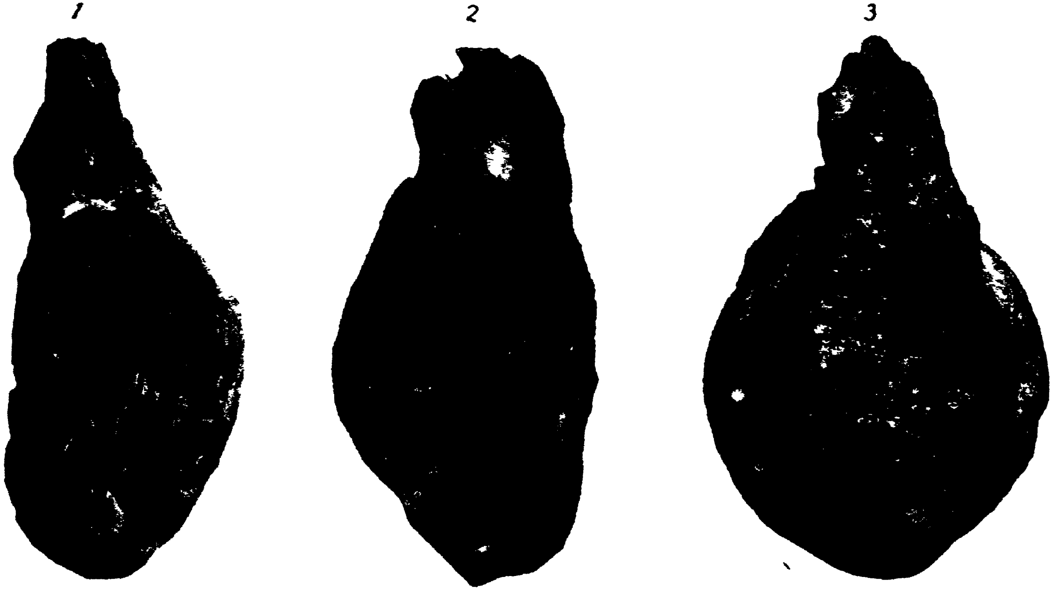
Neural Arches.—The neural arches are medially situated on the centra and are strong processes supporting prominent prezygapophyses, stout spines, a specialised hyposphene, but with no distinctive postzygapophyses. In the anterior vertebræ, the body of the neural arches occupies, in antero-posterior extent, about two-thirds of the length of the centrum, whilst the transverse diameter is about equal to half that of the centrum.

In the first three vertebræ, the prezygapophyses overlap the contiguous centrum and reach a point above the origin of the posterior part of the neural arch (Plate XXX., fig. 1). They are not quite horizontal in position, but project upwards somewhat, terminating in an obtuse apex, and in transverse section they are semi-circular, with the flat articulating surfaces vertically placed. In the more posterior vertebræ, as shown in Nos. 12 and 13, they do not project further than the intervertebral area and the arms are much compressed laterally. The transverse diameter of the neural arch at the articulating area is relatively small.

In the anterior vertebræ, the hyposphene projects backwards from the infero-posterior border of the neural spine and overlaps the inter-vertebral area and terminates just beyond this point. As may be seen from exposed cross-sections, its lateral contours are adapted to the curved recess between the arms of the prezygapophyses (Plate XXXII., figs. 1 and 2). Its inferior border, as distinct from the lateral areas, does not articulate with any



Rhœtosaurus brownei. Fig. 1.—Vertebræ 12 and 13 with moieties of Nos. 11 and 14. Figs. 2 and 3.—Chevron plates.



Rhœtosaurus brownei. Fig. 1.—Posterior face of 3rd vertebra. Fig. 2.—Anterior face of 4th vertebra. Fig. 3.—Area of fracture of 12th vertebra.

projecting processes on the contiguous vertebra, but it roofs over the neural canal for the extent of its projection. Immediately above the hyposphene is a prominent elongated oval recess which is continued upwards into the median portion of the posterior border of the spine. This recess cannot be interpreted as a zygantrum and could not have functioned as such (Plate XXXII., fig. 1).

In the posterior vertebræ, judging from the units in which this area is available for study, the structure is simpler. The hyposphene projects backwards over the neural canal and is embraced laterally by the projecting arms of the prezygapophyses, which are thin and tapering in this region, but there is no noticeable median recess in the posterior edge of the neural spine. Owing to the oblique position of the spine, the hyposphene, in the region of Nos. 12 and 13 of our series, may project backwards for one quarter of the length of the contiguous vertebra (Plate XXXI., fig 1).

The hyposphenal articulation may be compared with that of *Camarasaurus supremus* Cope, as described and illustrated by Osborn and Mook in their magnificent monograph,[12] although no close relationship is suggested between the two. As in the American reptile, the hypantral articulation surfaces are continuous with the prezygapophyses, but in *Rhœtosaurus* the inferior border of the hyposphene is not so extended and expanded below as in the articular complex figured by Osborn and Mook (Fig 40, p 303), for the dorsal vertebræ of *Camarasaurus*. Illustrations of the articulation of *Rhœtosaurus* in cross-section, as exposed by fracture, are given in Plate XXXII, but the region is somewhat distorted

It is practically certain that this simple and probably primitive method of articulation had a far more complex development in the missing dorsal series In our caudal specimens the hyposphene is a median wedge, relatively narrow in transverse section, and is not associated with a complex hypantrum. The writer has followed Zittel (Text-book of Palæontology, English trans., p 224) in considering the hyposphene as "a vertical or wedge-shaped projection occurring on the posterior end of the neural arch below and continuous with the postzygapophyses." There appears to be no uniformity in the use of these terms, however, for R. S. Lull, in his fine monograph on *Barosaurus*, describes the hyposphenes as a development from the anterior portion of the neural spine, probably owing to the special architecture of the articulating complex under review; and Marsh apparently takes this view in describing *Brontosaurus*.

The remarkable form of articulation in *Rhœtosaurus brownei* must have been associated with some specialisation in tail movement and function. There could have been little lateral movement of the individual vertebræ, except in a lengthy series, especially in the anterior region. Moreover, the unusual posterior extension of the hyposphene, roofing the neural canal, makes it difficult to conceive of vertical movement, except of the greater part of the tail in unison. Judging from the architecture of articulation, combined with the size and solidity of the centra, and the bulky chevrons, it seems that the huge tail of this Australian Dinosaur was somewhat rigid and may have acted as a tripod with the immense hind legs. This does not necessarily indicate close relationship with the Iguanodontidæ. The actual weight of the specimens is remarkable, and the very incomplete vertebra No. 3 is no less than 27¼ lb.

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[12] Osborn and Mook, Mem. Amer. Mus. Nat. Hist., n.s. iii., 1921.

Neural Canal.—This is situated above the superior borders of the centra and does not lie in an excavated groove. In the first vertebra the neural canal is sub-oval in section and is very large, the vertical diameter being 53 mm. and the transverse 44 mm. (Plate XXX., fig. 2). In No. 7 the diameters are 35 and 20, in No. 12 they are 27 and 10, and in No. 15 they are reduced to 20 and 14.

Articular Surfaces—These are amphicœlous throughout, but the concavity is much more marked in the anterior units. On the first vertebra the maximum depth of the concavity is at least 40 mm. behind the plane of the peripheral articulating surface (Plate XXX., fig. 2).

Marsh points out that the enlargement of the neural canal in the sacral region of *Stegosaurus* and some other Dinosaurs, the so-called "posterior brain case," is usually associated with "the great development of the posterior limbs"[13]

There are no very clear signs of the persistence of the neuro-central sutures, but the fact that the arches, or neurapophyses, are broken off in this region in several of the units suggests that it would be more obvious in less mature specimens.

Pelvic Fragments—There are numerous fragments that are attributed to the pelvic girdle, but they do not present any consequential evidence. The majority of these remains are small, shattered fragments and one or two of the larger specimens are much abraded. A small series representing part of a shaft has been put together; this is sub-oval in section, with one face flattened, and has a maximum diameter of 110 and a circumference of 245 mm. Other fragments, which probably belong to the same shaft, are sub-triangular in cross-section, two of the surfaces being flattened and forming almost a right angle, and the other surface being very concave. This concave surface or valley gradually becomes more shallow as it approaches the more oval section of the fragments. Another much abraded fragment presents evidence of a strong ridge arising on a broad shaft. These fragments are believed to be remains of an ischium.

Femur.—Owing to the fragmentary nature of this specimen, but little significance can be attached to the femur, but its dimensions suggest a very large bone (Plate XXXIII., figs. 1 and 2). The fragment is apparently from

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[13] O. C. Marsh, Dinosaurs of N. Amer., 16th Ann. Rep. U.S. Geol. Sur., 1896, p. 190.

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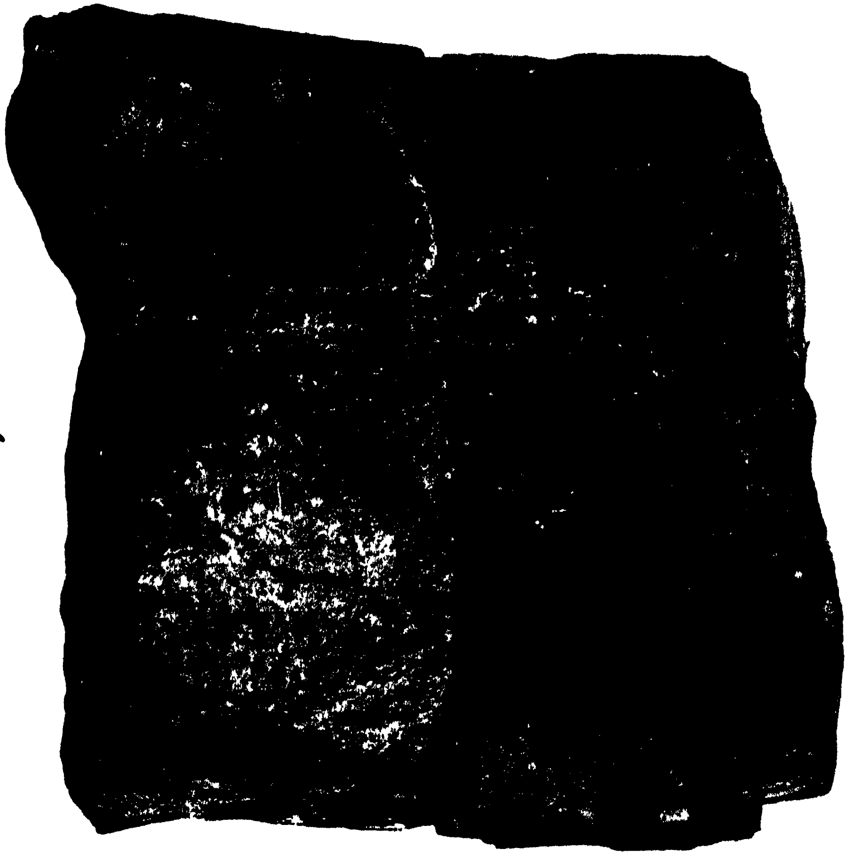

Rhœtosaurus brownei, Fragment of Femur Shaft. Fig. 1.—Lateral view, two-fifths natural size. Fig. 2.—Posterior view.

Face page 190.

near the middle of the shaft, and unfortunately no special features are available for comparison with other Dinosaurian femora. There is no sign of the fourth trochanter. This shaft fragment is oval in section and is 295 mm. or 11½ in. in length; the diameters are 300 and 90 mm., and the maximum circumference is 710 mm. or 28 in. In cross-section the major surfaces of the shaft are somewhat concave. The bone is fairly dense, except where abraded, and there is no evidence of a medullary cavity. This fragment represents a bone which is quite as large as, if not larger than, the femur of *Cetiosaurus* figured by Phillips, which was 64 in. in total length.[14]

A fragment attributed to part of the shaft of a tibia is much abraded, but has a circumference of approximately 20 in. or 510 mm. It presents no special features. There are two other fragments of a long bone which are believed to be portions of a fibula, but these are too small to warrant precise description, and the contours of the cross-section of the shaft are incomplete.

Affinities.—In the absence of cranial and pedal material it is difficult to give definite affinities for this Australian Dinosaur. The pelvic fragments are too incomplete to afford significant evidence, and in view of the importance of this region, as emphasized by the researches of Huxley, Seeley, Marsh, Baur, Abel, A. S. Romer, Nopcsa, von Huene, Osborn, Gregory, and Camp, and others, this is most unfortunate. Owing to the immense variety within the Dinosaurian assemblage and the evidence for convergent structures in families that are not closely related, resemblances in the characteristics of caudal vertebræ may be misleading. In so far as literature and descriptions are available many comparisons have been made, some of which are set out as follows :—

The very bulky solid vertebræ, with what may be called an orthozygous articulation suggesting comparative rigidity, together with the solid shafts of the long bones, make it almost certain that this Australian Dinosaur was a slow-moving herbivorous reptile, and the carnivorous Theropoda may thus be eliminated from consideration.

Although it is not improbable that the bulky tail acted as a tripod with hind legs that were relatively large compared with the fore limbs, it is not considered that *Rhœtosaurus* should be associated with the Iguanodontidæ. It may be noted, however, that the vertebræ of such different reptiles as *Iguanodon* and *Cetiosaurus* have been confounded by the earlier authorities, and that new types of Iguanodonts from Mongolia have been recently recorded by Osborn.

The following comparisons may be of interest :—The dimensions of the caudal vertebræ of *Rhœtosaurus* considerably exceed those of the vertebræ of *Iguanodon* as recorded by J. W. Hulke.[15] They also much exceed the caudal vertebra first figured by Owen as "*Pelorosaurus Conybeari*,"[16] the dimensions of which (length 102, vertical diameter 225, transverse diameter 198 millim.) are given by Lydekker, who refers it to *Iguanodon*.[17]

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[14] J. Phillips, Geol. of Oxford, 1871, p. 281.

[15] J. W. Hulke, Quart. Journ. Geol. Soc., vol. 38, 1882, p. 142.

As the length of *Iguanodon bernissartensis* is estimated at 33 ft., judging from these proportions *Rhœtosaurus* attained at least 40 ft.

The Durham Downs vertebræ, however, differ greatly from those of *Iguanodon*, which, according to Hulke, have postzygapophyses and a relatively small neural canal. The elongated chevron bones of *Iguanodon* are very distinct from those of *Rhœtosaurus*, and the limb bones of the former were hollow.

The specialised characters of the spines and the dermal armature of the Stegosauridæ widely separate this group from the Australian Dinosaur.

Rhœtosaurus should probably be placed in the Sauropoda, and in certain respects it presents resemblances to the caudal vertebræ of *Cetiosaurus* (*Cardiodon*), as described by Phillips.[18] The centra, however, are more elliptical and the postzygapophyses are absent, being reduced to mere indents on the postero-lateral areas of the neural spines.

Although the vertebræ as a whole do not closely resemble those of *Camarasaurus*, the somewhat similar type of hyposphenal articulation, previously noticed, may be significant. The American reptile, which attained over 57 ft., has somewhat larger vertebræ and postzygapophyses are present.

From the gigantic caudal vertebræ, first figured by Falconer[19] and subsequently described by Lydekker as *Titanosaurus indicus*.[20] our specimens are readily distinguished by being amphicœlous instead of procœlous. The caudal vertebræ of *Rhœtosaurus* are exceeded by those of *Atlantosaurus* (*Camarasaurus* ?), one of which is recorded by O. C. Marsh as being "over 16 in. (420 mm)" in transverse diameter.[21]

It is obvious that *Rhœtosaurus* has no close affinities with *Diplodocus*, which, as described by Hatcher,[22] has supplementary buttresses or laminæ and cavities in the centra; or with the East African giant *Tornieria* (or *Gigantosaurus*), which is said to be related to the lengthy American reptile. For similar reasons it cannot be closely compared with *Barosaurus*, as monographed by R. S. Lull,[23] or with Cope's *Amphicœlias*. Our vertebræ are very dissimilar from those in the *Brontosaurus* group, with a relatively light vertebral column, centra with lateral cavities and cruciform spines, as described by Marsh.[24]

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[16] Owen, Foss. Rept. Weal. Purb., Supp. 2, Pl. XI.

[17] Lydekker, B. M. Catal. Foss. Rept. Amph., i., 1888, p. 208.

[18] J. Phillips, Geology of Oxford, 1871, p. 260.

[19] H. Falconer, Pal. Mem., i., 1868, Plate 34.

[20] R. Lydekker (Mem. Geol. Surv. India (4), vol. i., p. 20).

[21] O. C. Marsh, Amer. Journ. Sci. (3), xv., 1870, p. 242.

[22] T. B. Hatcher, Mem. Carnegie Mus., i., 1901, p. 35.

[23] R. S. Lull, Mem, Conn. Acad. Sci., vi., 1919.

As Owen's *Cetiosaurus* is apparently a synonym of *Cardiodon*,[25] the old Family Cetiosauridæ—which, according to Zittel,[26] includes the Mosasauridæ and Atlantosauridæ of Marsh—is displaced by Cope's Camarasauridæ. With certain qualifications, mainly due to the inadequacy of our material, *Rhœtosaurus* may be placed in this family for time being.

Dinosaur or Saurischian.—F. R. von Huene has come to the conclusion that the Dinosauria are not of monophyletic origin and that Owen's term Dinosauria "should be abandoned absolutely."[27] Following H. G. Seeley, but with far greater wealth of material and opportunity for research, he divides the old order into two groups: Saurischia (= Theropoda + Sauropoda) and Ornithischia (= Orthopoda). Williston considers that this separation "has much to commend it,"[28] and W. D. Matthew endorses it.[29] The word "Dinosaur" is so generally adopted in literature, however, that the writer has preferred to use it in the description of this new Australian material, and there appear to be many reasons for the retention of Owen's term for at least part of this immense reptilian assemblage.

CONCLUSION.

The fossils from Durham Downs give definite evidence of a gigantic herbivorous Dinosaur from Jurassic deposits in Queensland, with distinctive characters in its caudal vertebræ, as outlined in this paper. This has been named *Rhœtosaurus brownei* and has been tentatively placed in the Family Camarasauridæ of the Sauropoda. This reptile was a bulky, herbivorous quadruped, with dominant hind limbs, a somewhat rigid tail, and probably attained over 40 ft in length.

In view of the prodigious variety of Dinosaurian forms recorded from other parts of the world, illustrating the "bizarrerie" of nature to a degree unsurpassed by any other group, it will not be surprising if many additional forms are found in the future in Australian deposits.

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[24] O. C. Marsh, The Dinosaurs of N. Amer., 16th Ann. Rep. U.S. Geol. Surv., 1896, p. 171.

[25] L. P. Bush, Amer. Journ. Sci., xvi., 1903, p. 96.

[26] Zittel's Text-book of Palæontology, Eng. edition, ii., 1902.

[27] F. R. von Huene, Amer. Journ. Sci., (4) xxxviii., 1914, p. 145.

[28] S. W. Williston, Rep. from Journ. Geol., xxv., 1917, p. 414.

[29] W. D. Matthew, Ann. Rep. Smith. Inst., 1923, p. 279.

EXPLANATION OF PLATES.

PLATE XXIX.

Consecutive series of caudal vertebræ of *Rhœtosaurus brownei,* photographed in juxtaposition, total length 9 ft., or 2 metres, 743 mm. (Owing to the abraded surfaces it was found impracticable to photograph the left side—the more usual position.)

PLATE XXX.

Fig. 1.—Conjoined vertebræ 1 and 2 of *Rhœtosaurus brownei,* showing prezygapophysis, area of fracture of transverse process, and incomplete chevron. The anterior vertebra is much abraded.

Fig. 2.—Anterior face of vertebra 1 of *Rhœtosaurus brownei,* showing very concave articulating surface and large neural canal.

PLATE XXXI.

Fig. 1.—Vertebræ 12 and 13 with moieties of Nos. 11 and 14, showing typical orthozygous articulation of *Rhœtosaurus brownei.*

Fig. 2.—Chevron plate between vertebræ 10 and 11, with concave inferior margin.

Fig. 3.—Chevron plate from left side, between vertebræ 1 and 2.

PLATE XXXII.

Fig. 1.—Posterior face of third vertebra of *Rhœtosaurus brownei,* showing hyposphene with median recess above and section across prezygapophyses of contiguous vertebra.

Fig. 2.—Anterior face of fourth vertebra showing section across hyposphene and prezygapophyses, contiguous with Fig. 1 (area distorted).

Fig. 3.—Area of fracture of vertebra 12, showing laterally compressed mid-region of centrum and neural canal.

PLATE XXXIII.

Fig. 1.—Lateral view of fragment of femur shaft of *Rhœtosaurus brownei.* Two fifths natural size.

Fig. 2.—Posterior view of femur-shaft fragment.

THE CRETACEOUS *AMMONOIDEA* OF EASTERN AUSTRALIA.

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(1922-25 Foundation Travelling Scholar of the University of Queensland).

GEOLOGICAL SURVEY OF QUEENSLAND.

(Plates XXXIV.-XLI.)

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INTRODUCTION.

The present paper is an attempt to revise the ammonite fauna of the "Rolling Downs Formation" of Eastern Australia in the light of recent palæontological work in other countries. Hitherto no comprehensive attempt has been made to establish and correlate palæontological horizons within the formation; and it is to be hoped that the present review may serve as the basis of a more minute treatment of the whole fauna.

For very many years almost the sole worker on the fossils of the "Rolling Downs" has been the late Robert Etheridge junr. His patient, detailed and richly illustrated work has paved the way towards a zonal treatment of the fauna; and the writer is deeply indebted to the fine series of monographs which Etheridge produced on the Cretaceous Palæontology of Australia. It is no reflection upon the work of Etheridge that in this paper, in accordance with recent developments, more modern generic determinations are used. Etheridge keenly appreciated the generic analyses of the mesozoic cephalopods; and much of the effective work on the Lower Cretaceous lineages has been done since the appearance of his last important paper on the Australian forms (1909).

The present examination, which has been carried out in the Sedgwick Museum, Cambridge, has been made possible largely by a grant from the University of Queensland. The material used has been drawn mainly from the collections of the Queensland Museum, Australian Museum and British (Natural History) Museum. To all these institutions the writer expresses his gratitude. To Mr. H. A. Longman, Prof. H. C. Richards, Mr. W. H Bryan and Sir Edgeworth David for constant interest in the progress of the work; to Mr. H. Woods for general advice; to Mr. A. G. Brighton for critical and other assistance; and particularly to Dr. L. F. Spath for much ever-ready help and kindly criticism he is deeply indebted.

STRATIGRAPHICAL AND GENERAL RESULTS.

Within the "Rolling Downs" two main series are apparent, which on both lithological and palæontological grounds are markedly distinct. The lower, to which the name *Roma Series* is now given, comprises the group of bluish clays (mainly) with calcareous concretions; the upper, for which the name *Tambo Series* is proposed, consists mainly of yellowish limestones often with cone-in-cone structure. Both series are widely distributed.

A. MORVEN BED.—The one specimen containing *Simbirskites spp.* is all the evidence so far available of this bed, which is the oldest marine mesozoic horizon known in Eastern Australia. It indicates the presence of the Simbirskitan stage of the Hauterivian.

B. ROMA SERIES.—The ammonite genera recorded from this series are: *Parahoplitoides* (?), *Aconeceras*, *Sanmartinoceras*, *Australiceras*,[1] *Tropæum*, *Toxoceratoides* and *Aioloceras*.[1] Three palæontological divisions are possible:—

iii. Beds with *Sanmartinoceras* and *Aioloceras*;
ii. Beds with *Tropæum* and *Aconeceras walshense*;
i. Beds with *Australiceras* and *Toxoceratoides*.

As mentioned below the genus *Australiceras* is first known with certainty in the *bodei* zone of the Bedoulian (Lower Aptian) and is replaced in the *hillsi* zone of the Lower Gargasian by *Tropæum*. The beds with *Australiceras* correspond therefore to the Upper Bedoulian. Whether any of the Lower Bedoulian is present is uncertain. The four zones of the Upper Bedoulian (*bodei*, *weissi*, *hambrovi* and *consobrinoides*) cannot be recognised at present, though *Australiceras robustum* is probably low zonal while *A. transiente* most probably occurs at the top of the beds.

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[1] New genera (v. inf.).

The beds with *Tropæum* naturally correspond to the Tropæuman of Europe (Lower Gargasian). Species of *Tropæum* are abundant, the only other genus recorded being *Aconeceras* (*A. walshense*).[2] As mentioned below the vertical ranges of *Australiceras* and *Tropæum* may overlap, so that there may be a very indefinite junction between these two divisions.

The highest division of the Roma Series has yielded *Aioloceras jonesi*, *Sanmartinoceras fontinale* and *S. olene*. *Sanmartinoceras* is restricted to the top of the Gargasian; while *Aioloceras*, from its position in the section in Patagonia, is apparently also Upper Gargasian.

If the deposition of the Roma Series was continuous, then the series ranges at least from the *bodei* to the *aschiltaensis* zone of the Aptian (*Sanmartinoceras* defines the latter zone). But there is no evidence at present that it extends into the Lowest Albian as it may do in the central (concealed) portion of the area. Ammonites from all three divisions have been found in the Queensland areas; but in New South Wales and South Australia the upper division only has yielded ammonites (*Parahoplitoides ? sp.*, however, from South Australia may be from the lower (*Australiceras*) division). But the evidence, to be published later, of the other elements of the fauna shows that all three divisions are well represented in these States.

C. MARYBOROUGH BEDS.—As shown by Richards (**82**, p. 182) and others these beds are composed of a lower (sandstone) and an upper (chert) division. The sandstones have yielded fragments of *Australiceras jacki* but no ammonites are known from the cherts. The sandstones, therefore, from their ammonite remains correspond to part of the lower division of the Roma Series. The writer hopes to show in a later paper, when considering the Lamellibranchs, that the whole of the Maryborough Marine beds are to be correlated with the *Australiceras* beds of the Roma Series.

D. TAMBO SERIES.—The ammonite genera recorded from the Tambo Series are: *Puzosia*, *Beudanticeras*, *Prohysteroceras*, *Inflaticeras*, *Hamites*, *Anisoceras*, *Labeceras*,[3] *Appurdiceras*,[3] *Myloceras*,[3] *Aleteceras*,[3] and *Flindersites*.[3]

The species of **Prohysteroceras** *and* **Inflaticeras** *are shown to be characteristic of the upper* **orbignyi** *and the* **varicosus** *zones of the Upper Albian and the specimens are preserved in a deep yellow, marly limestone. Specimens* of *Flindersites baccatus*, *Aleteceras plectoides*, *A. tardicostatum*, *A. nautiloides*, *Myloceras ammonoides*, *M. davidi*, *Labeceras bryani*, *L. compressum*, *Puzosia longmani*, etc., also occur in this type of matrix and no doubt represent the same horizon.[4] The matrix of the specimens examined of *Beudanticeras flindersi*, *B.* (?) *daintreei*, *Flindersites intermedius*, *Myloceras orbiculus*, *Hamites* aff. *maximus*, etc., is rather lighter in colour. This may represent local variations of the other matrix or may point to a slightly different horizon for these species. Since the species of *Beudanticeras* and *Hamites* do not give any very definite indication of their zonal position within the Upper Albian, it is tentatively assumed that these species represent the same horizon as *Prohysteroceras richardsi*, etc.

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[2] *Aconeceras walshense* is placed in this division from the agreement of its matrix with that of *Tropæum rarum* rather than with that of the species of *Australiceras* from the same locality.

[3] New genera (v. inf.).

The position of the Tambo Series is, therefore, Upper Albian, and at present there is no evidence of more than the *orbignyi* and *varicosus* zones being present.

CONVENTIONS.

The nomenclature used throughout this paper for specific descriptions is that of Buckman (**11**) and Spath (**101**, p. 7). The terms "crioceratid," "ancyloceratid," etc., are used to denote types of coiling and not to indicate relationships with the genera *Crioceras*, *Ancyloceras*, etc.

Dimensions are given according to the generally adopted plan instituted by Buckman, where the first numeral gives the diameter in mm., the other three numbers being (in order) the whorl-height, whorl-thickness and width of umbilicus, reckoned as percentages of the diameter. Where a number is inserted in brackets after the first numeral, as e.g. in the topotype of *Aconeceras walshense*, the first number is the maximum diameter noted, while that in brackets is the diameter at which the other dimensions are taken. The Greek letter ϕ is attached in such cases where the measurements are taken from a published figure and not from the actual specimen.

In comparing fragments of crioceratids the writer proposes an additional method of measurement. Two numbers are given (as in the case of *Aleteceras tardicostatum*), the first of which is the maximum height of whorl in mm., and the second is the width of whorl given as a percentage of the height. Such measurements are prefixed by the Greek letter θ. In cases where measurement is made from a published figure and not from the original specimen the letter ϕ is used as well (see *Tropæum leptum*).

The zonal nomenclature used is that of Dr. Spath (**99** and **100**), to whose comprehensive and detailed work on the Cretaceous the author is particularly indebted.

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[4] A specimen of *Flindersites baccatus*, in the writer's collection, is associated, in the hand specimen, with *Prohysteroceras richardsi*.

The following abbreviations have been used to indicate the collections in which types and other specimens are lodged:—

A.M.—Australian Museum (Sydney).
B.M.—British Museum (Natural History).
F.W.W.—The author's collection.
G.S.Q.—Geological Survey of Queensland.
G.S.S.A.—Geological Survey of South Australia.
Q.M.—Queensland Museum.
N.M.—National Museum (Melbourne).
M.G.M.—Mining and Geological Museum (Sydney).
M.M.—Macleay Museum (University of Sydney).
R.D.—Daintree Collection (now in the Queensland Museum).
U.Q.—University of Queensland.

ON HETEROMORPHIC AMMONOIDEA.

Probably the most notable feature about the ammonoid faunas of the Cretaceous of Eastern Australia is the profusion of heteromorphic forms. Yet, strangely enough, no helicoid genus has been found in these beds. Many of the genera present are inadequately known from other areas, and consequently Etheridge, who appreciated fully the richness of the fauna in these aberrant types, left them all provisionally in *Crioceras* sensu lato.

According to the theory of cyclical development, crioceratid forms were regarded as the phylogerontic stage of cycles of genera all with more or less the same general trend. But the recent work of Spath and Salfeld has cast grave doubts on this theory, and has shown that it is far more probable that the two persistent leiostrachous stocks, *Phylloceratidæ* and *Lytoceratidæ*, have been the main sources from which the transient waves of the normal trachyostrachous ammonoids have developed. *Lytoceratidæ* and *Phylloceratidæ* in most features are at opposite extremes—the one being extremely evolute with a septal suture having the minimum number of major indentations, the other with highly involute whorls and a septal suture with a profusion of accessory lobes. Crioceratid forms could be produced from these stocks in three main ways:—

(1) They may be end points of offshoots from *Phylloceratidæ*, the lineages having passed through all degrees of normal volution on the way;

(2) They may be derived directly from *Lytoceratidæ*, which, in their extreme involution, are but one step removed from crioceratid coiling; or

(3) They may be derived indirectly from *Lytoceratidæ*, occurring at a late stage in a lineage which has passed through other modifications before developing "uncoiled" forms.

It might naturally be expected, therefore, that most crioceratids are directly derived from *Lytoceratidæ*, and the essential simplicity[5] of the venter in all such forms might also suggest this. But such genera as *Distoloceras* and *Astiericeras* give evidence that many stocks of normal trachyostrachous ammonites produce "uncoiled" forms.

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[5] Fastigate, carinate, or sulcate forms being unknown.

The details of septal sutures are of interest. In the normal large lytoceratids the suture is of the essential (I.U.L.E.) type; and without exception this type of suture is a feature of the heteromorphic forms. But this agreement in sutural plan among the latter has no genetic significance (even in tracing ancestry), for there can be no doubt that this type of suture is merely due to the mode of coiling. This is well seen in the genus *Distoloceras*, which has both "coiled" and "uncoiled" species; for in the former there are accessory lobes present, whereas in the latter the sutures are of the I.U.L.E. type. Zittel (**116**, vol. i., p. 332), Spath (**95**, p 28), and others have drawn attention to the modification of septal suture due to the whorl shape. It may be pointed out that in the *Lytoceratidæ* the large forms (*Lytoceras* s. str., *Thysanoceras*, etc.) the septal sutures are of the I U.L.E. type, while the smaller forms (*Gaudryceras*, *Alocolytoceras*, etc.) have accessory lobes. But unfortunately the complete development of a large lytoceratid has never been made, and even in the small *Gaudryceras* (?) *alamadense* developed by Perrin Smith[6] there is reduction of sutural elements.

The sutural simplification in, e.g., *Baculites* has been adduced as evidence of a benthonic habit. But many crioceratids, e.g. *Tropæum*, have quite complicated sutures; and this throws doubt upon the idea sometimes advanced that *all* crioceratids were benthonic. Certainly the increased fragility due to loose coiling would hinder rapid motion through the water; but this is compensated for by the increased thickness of shell which these forms attain.

But even though the number of lobes and saddles is reduced to the minimum, yet the details of the indentations of the septal sutures are still of service in tracing generic affinity, while the type of ornamentation is of fundamental importance.

DESCRIPTION OF SPECIES.

A. NEOCOMIAN SPECIES.

Family SIMBIRSKITIDÆ Spath.

Genus SIMBIRSKITES Pavlow (emend. Spath).

SIMBIRSKITES SPP. NOV.

1909 *Perisphinctes kayseri* (non Neumayr and Uhlig) Etheridge Jr. (**30**), p. 238, pl. 68.

The two associated specimens figured by Etheridge were regarded as the same species and identified by him with the *Perisphinctes kayseri* Neumayr and Uhlig (**65**, p. 146, pl. 19, fig. 1) of North Germany. But the German and Australian specimens differ considerably in proportions and cannot therefore be specifically identical.

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[6] Proc. California Acad. Sci., Ser. 3, Geol., vol. i., 1898, pp. 138 *et seq.*

The zonal place of the large (*kayseri*) group has sometimes been misstated. Buckman (**11**, vol. iv., p. 16), e.g., by analogy with the Mexican *Proniceras*, has lately placed it even in the Lower Tithonian. But Spath (**103**, p. 87), in restricting *Simbirskites* to the *decheni* group with trifurcating ribs, has placed it in its true position in the Upper Hauterivian.[7] From Etheridge's figure (the specimens have not been seen by the writer) *S. kayseri* is the most similar form but has less rapidly increasing whorls. At the same time, however, it must be remembered that his specimen is considerably larger than the holotype of *S. kayseri*. The septal suture seems to be definitely simbirskitid. Most of the species of *Simbirskites* are known only from young specimens, which makes the comparison of this large form difficult. The large species figured by Neumayr and Uhlig (*S. hauchecornei*, *S. inverselobatus*, etc.) are less widely umbilicate, while *Perisphinctes losseni* Neumayr and Uhlig (**65**, p. 144, pl. 18) is probably a *Speetoniceras*.

The smaller specimen, which is probably a different species, is of the more normal[8] *Simbirskites* type.

Since the writer has not seen the specimens[9] it is not *definitely* established that the species do not belong perhaps to an earlier genus (e.g. the Kimmeridgian *Virgatites*), although their resemblance to *Simbirskites* is so strong. But they certainly represent the oldest marine mesozoic horizon yet known in Eastern Australia.

Simbirskites has been recorded (**50**, p. 114) though not figured from New Caledonia.

Locality.—Victoria Downs, Morven (Q.M. Coll.).

B. APTIAN SPECIES.

Family ACONECERATIDÆ Spath.

Two genera only, both represented in the "Rolling Downs," have hitherto been included in this family—*Aconeceras* Hyatt[10] and *Sanmartinoceras* Bonarelli. In erecting the genus *Aconeceras* Hyatt (**41**, p. 100) called attention to its phylloceratid characters, particularly the details of the septal suture, though he included it in the later family *Coilopoceratidæ*. But, from his manuscript notes,[11] he finally placed it "with the *Desmoceras* group" in *Phylloceratidæ*. Spath also has suggested that the family is derived from

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[7] Large specimens of these *Simbirskites* have been found by the writer in bed C_4 at Speeton.

[8] Compare e.g. *S. payeri* (Toula) Pavlow (**72**, p. 148, pl. 11, fig. 1).

[9] Since the above description was written the writer has been able to examine the specimens and confirm their position within the genus *Simbirskites*. A further note on these forms will appear in a later paper.

[10] = *Adolphia* Stolley (**105**), p. 269.

[11] See footnote by J. P. Smith to Hyatt (**41**, pp. 100, 101).

Desmoceratidæ (**101**, p. 35). But the approximation of the earlier genus, *Aconeceras*, to *Phylloceras* in involution, ornament and septal suture gives evidence of a direct connection with *Phylloceratidæ*, and the view is here held that, like *Desmoceratidæ*, it is an independent branch from *Phylloceratidæ*.

The aconeceratid type of shell—i.e., an oxyconic form with falciform radial line and complicated septal suture of the phylloceratid type—is perhaps the most recurrent among the many oft-recurring types of trachyostrachous ammonites. The Lower Lias *Oxynoticeras* is an early type while the Mæstrictian *Pseudoschlœnbachia* (*umbulazi* group) is the last. On the theory of cyclical development such forms have been regarded as end points of series passing from an original capricorn type. But it is far more probable that these genera are heterochronous homœomorphs very close to *Phylloceratidæ*.[12] The Bajocian and Bathonian with *Lioceras*, *Strigoceras*, etc. is particularly rich in such forms. Comparison with *Strigoceras* is interesting, for similar concentric ornamentation typical of that genus is to be seen on *Aconeceras walshense* (Etheridge fil.).

The family ranges throughout the Aptian but is unknown in the Neocomian or Albian. Stolley (**106**, p. 217), it is true, has a zone of *Sanmartinoceras trautscholdi* which has sometimes been placed in the Lower Albian; but from the association of that species with *Parahoplites*, etc., it belongs to the uppermost Aptian. *Aconeceras* ranges through the Bedoulian and Lower Gargasian, and in the Upper Gargasian is replaced by *Sanmartinoceras*. But in the Bedoulian there is an offshoot from *Aconeceras*, **THEGANECERAS** gen. nov.,[13] which closely simulates *Sanmartinoceras*, and, as indicated below, probably accounts for certain records of the genus *Sanmartinoceras* in the Bedoulian.

Genus ACONECERAS Hyatt.

Specific distinctions within this genus are not easy to define. Stolley (**106**, pp. 211, 215) has recorded *A. nisus* (d'Orbigny) from the *sparsicosta* zone (the lowest zone of the Aptian) and *A. nisoides* (Sarasin) from the *bodei* zone of the Bedoulian. On the other hand Haug (**38**, p. 1170) places *A. nisus* as Lower Gargasian; and Kilian has recorded (**48**, p. 338) *A.*

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[12] Interesting evidence on this point is given by the ornamentation. Most of the genera have the simple costulæ ("striæ") which are typically developed on *Phylloceras*; but on many lineages peripheral costation is suddenly developed similar to that of the phylloceratid *Tragophylloceras ibex* (Quenstedt). In that species, however, the course of the costæ and the costulæ does not correspond, and a costula may transgress two costæ as shewn by an example in the Sedgwick Museum Collection. This may be paralleled in the trachyostracous oxycones, and a similar transgression of the peripheral costæ is seen e.g. in "*Hebetoxyites*" *incongruens* Buckman (**11**, vol. v., pl. 497) from the Bajocian.

[13] θηγανη, a whetstone; genotype *Oppelia scalata* von Koenen (**51**, p. 54, pl. xlv., fig. 6). The genus is ribbed like *Sanmartinoceras* but the ribs are finer and more numerous. The septal suture is characterised by broad, short saddles. Other species are *T. falcatum* (v. Koenen), *T.* "*nisoides*" (pars) (v. Koenen non Sarasin).

nisoides as Bedoulian and *A. nisus* as Gargasian. In a later paper, however, Kilian[14] places *A. nisoides* also as Gargasian. Kilian and Haug therefore both agree in placing *A. nisoides* as Gargasian, only Stolley disagreeing in recording it in the Bedoulian. The specimens figured under this name from Zululand by Spath (**96**, pl. 26, fig. 4) and Delagoa Bay by Krenkel (**54**, pl. 17, fig. 1) are both recorded with Gargasian species.

Danford, however, figures a Speeton form as *A. nisoides* (**19**, pl. 14, fig. 7) which has been shown by Spath (**103**, p. 83) to belong to the *bidentatum* zone of the Bedoulian. The thickness of these figured specimens, given as a percentage of the whorl diameters, are—

A. nisoides (holotype) 21%; Speeton (Danford) 25%;
Zululand (Spath) 23%; *Basses Alpes* Specimens (B.M. Coll.) 21%;
Delagoa Bay (Krenkel) 22%.

Danford's specimen is thus thicker than the true *nisoides* and requires another specific name. It is probable, therefore, that Stolley's "*A. nisoides*" from the Bedoulian is this species rather than the true *nisoides*, which must be considered (? Lower) Gargasian. Von Koenen has recorded *A. nisoides* (**51**, p. 51) from the Bedoulian; but some of his specimens belong to *Theganeceras*, and it is doubtful if he has a form (even pl. 16, fig. 6) which is comparable with *nisoides*.

The horizon of such unfigured forms as that of Coquand (**14**, p. 46), e.g., is of course unknown

ACONECERAS WALSHENSE (Etheridge fil.).

Pl XXXIV., figs. 1 *a*, *b*; Pl. XXXVII., fig. 3.

1892 *Ammonites* (*Amaltheus*) *walshense* Etheridge Jr. (**42**), p. 493, pl. 42, figs. 10, 11.

Sp. Chars.—Coiling oligogyral, angustumbilicate, concavifastigate; sides slightly curved, convergent; anguliradiate, radial line with long peripheral projection; ornamentation by radial costulæ and a few mediolateral concentric costulæ; septal suture complicated, with many auxiliary lobes.

Dimensions —

Holotype (Q.M. Coll.): ϕ 78. 58. 16. 13.
Topotype (Q.M. Coll.): { 80 (68). 54. 18. 13.
49. 56. 19. 14.

Remarks.—This species is the largest known member of the genus and is particularly distinguished by the long peripheral curve of the radial line. It is most similar to *A. nisoides* (Sarasin) (**84**, p. 155, pls. 4-6, fig. 10), which it resembles closely in proportions, ornament, and septal suture. The numerous radial costulæ which characterise *A. nisoides* are present on *A. walshense*, and both species have the mediolateral concentric costulæ. Besides the difference in radial line *A. walshense* may be distinguished by its whorl section. *A. nisus* (d'Orbigny) (**69**, p. 184, pl. 55, figs. 7-9) and *A. aptiana* (Sarasin) (**84**, p. 155, pl. 4-6, fig. 12) also have different whorl sections, while the latter species, in its ornament, is transitional to *Sanmartinoceras*.

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[14] Trav. Lab. Géol. Univ. Grenoble, vol. xii., 1919, p. 94.

The species had been compared by Etheridge with forms belonging to several oxyconic genera, including *Amaltheus*, *Forbesiceras*, etc.

Locality.—Walsh River (Q M. Coll.; holotype and others).

Genus SANMARTINOCERAS Bonarelli.

Sanmartinoceras includes the costate *Aconeceratidæ* of the Upper Gargasian. Stolley had recorded it from the Aptian of Ahaus (**106**, p. 217), where it is associated with *Parahoplites schmidti* and represents the uppermost Gargasian. Stolley (**106**, p. 215) has, however, recorded *S. haugi* (Sarasin) from the Bedoulian. This is certainly an error and perhaps the species meant was a *Theganeceras*.

In 1880 Prof. W. J. Stephens[15] recorded "*Ammonites biflexuoides*" from New South Wales Such a specific name might refer to any member of the *Aconeceratidæ*. It is possible that Hudleston's later *Am. fontinale* may be indicated; but unless the specimen be found the name *biflexuoides* must be abandoned.

SANMARTINOCERAS FONTINALE (Hudleston)

1890 *Ammonites fontinalis* Hudlestone (**39**), p. 241, pl. 9, fig. 1.
1902 *Amaltheus sp. ind.* Etheridge Jr. (**25**), p. 45, pl. 7, fig. 8.
1924 *Sanmartinoceras fontinale* Spath (**103**), p. 74.

Sp. Chars.—Coiling oligogyral, angustumbilicate, compressed; concavifastigate; sides subparallel; anguliradiate with costation which diminishes towards the umbilicus.

Dimensions—Holotype (B.M. Coll.): 25. 50. 26. 19.

Remarks.—Three other species of *Sanmartinoceras* have been described—the genotype *S. patagonicum* Bonarelli (**6**, p. 27, pl. 5, figs. 3-6), *S. trautscholdi* (Sinzow) (**90**, pl. 5, fig. 6) and *S. haugi* (Sarasin) (**84**, p. 156, pl. 4-6, figs. 11). Kilian (**48**, p. 337) has suggested that the last two are identical; but, although very similar, they must probably be regarded as distinct since, as figured by Sinzow, *S. trautscholdi* has the ribs continued to the umbilicus, whereas in *S. haugi* this is not so. Stolley (**106**, p. 217) records the former from Germany; but a specimen of *S.* aff. *trautscholdi* from near Lehrte (N.W. Germany) in the British Museum Collection has a wider umbilicus though, in that specimen, it widens with age.

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[15] Proc. Linn. Soc. N.S. Wales, vol. viii., pt. 2, p. 281.

In having the ribs only on the ventro-lateral region *S. fontinale* is most similar to *S. haugi* and *S. patagonicum*. It is closer to the former in size and intensity of ribbing. A new species in the B.M. collection (c. 14366) from Germany has a very much wider umbilicus.

Localities.—Primrose Springs (B.M. Coll. holotype); Lake Eyre Basin (Tate Coll.).

SANMARTINOCERAS OLENE (Tenison-Woods).

Pl. XLI., fig. 3.

1883 *Ammonites olene* Tenison-Woods (**109**), p. 150, pl. 7, fig. 8; pl. 8, fig. 1.
1892 *Ammonites* (*Amaltheus*) *olene* Etheridge Jr. (**42**), p. 492, pl. 30, fig. 4.
1901 *Amaltheus olene* Etheridge Jr. (**24**), p. 32, pl. 2, fig. 4.

Sp. Char.—Coiling oligogyral, angustumbilicate, compressed; concavifastigate; sides subparallel; anguliradiate with costæ diminishing towards the umbilicus; costate portion begins very late; septal suture complicated, densiseptate.

Dimensions.—Q.M. Coll. $\begin{cases} 56. \ 56. \ 20. \ 11 \\ 37. \ 56. \ 23. \ 13. \end{cases}$

Remarks.—It is of interest that, since the related *Aconeceras walshense* is the largest member of its genus, the present species is the largest *Sanmartinoceras.*

The figure given by Etheridge in 1901 (**24**, pl. 2, fig. 4) of this species is somewhat incorrectly drawn.[16] The ribs were represented as rectiradiate whereas the course is typically falciform.

Etheridge believed that *S. olene* and *S. fontinale* represented but one species. There is certainly a considerable amount of variation in the forms that must be included in *S. olene*; but there seems to be a distinct specific difference between the forms from North Queensland (*S. olene*) and those of the Lake Eyre Basin (*S. fontinale*) in that, on the latter species, costation begins at an earlier stage than on *S olene.*

S. patagonicum is apparently the most closely related species outside Australia, although *S. trautscholdi*, in which costation is not so prominent, is also close.

Localities.—Palmer River (M.M. Coll., holotype); Walsh River (G.S.Q. and Q.M. Colls.).

Family PARAHOPLITIDÆ Spath.

This important family, which includes such genera as *Parahoplites, Parahoplitoides, Stenhoplites, Dufrenoyia* and *Columbiceras*, is only doubtfully known in Australia from a single fragment. The family has a wide distribution; and, considering the large collections of Aptian Ammonites known from the Roma Series, the apparent rarity or absence of the group is remarkable.

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[16] The specimen has been examined by the writer.

Genus PARAHOPLITOIDES Spath.

PARAHOPLITOIDES (?) SP.

1901 *Haploceras daintreei* Etheridge Jr. (non Etheridge Sen.) (**25**), p. 44, pl. 7, fig. 1.

This South Australian specimen was thought by Etheridge to be an aged example of *Puzosia daintreei.* But the type of ribbing (particularly the straightness of the costæ) is rather against this. The species may be a specialised form of *Parahoplitoides*, similar perhaps to *P. læviusculus* (von Koenen) (**51**, p. 224, pl. 8, figs. 4, 5). The type section of *Parahoplitoides* has rather flexed costæ as shown on *P. deshayesi* (Leymerie) (**56**, pl. 17, fig. 17); but species with more or less straight costæ are common.

Locality.—Dulkaninia Bore at a depth of 1,400 feet (Brown Collection).

Family CLEONICERATIDÆ nov.

The family is proposed for *Pseudosaynella* Spath, *Aioloceras* gen. nov. (v. inf.), *Cleoniceras* Parona et Bonarelli and *Sonneratia* Bayle. *Pseudosaynella*, which connects the family with *Aconeceratidæ*, might well be included in either family for it is closely related to *Aconeceras.* It is most probable that *Aioloceras*, which apparently gave rise to *Cleoniceras*, is directly derived from *Pseudosaynella.* The *balmense* group of *Cleoniceras* and the genus *Sonneratia* specialise in ornate forms; and it is not unlikely that even *Hoplitidæ* (via *Leymeriella*) may be in part derived from *Cleoniceratidæ.*

Genus **AIOLOCERAS** nov.[17]

Genotype *Cleoniceras argentinum* Bonarelli (**6**), p. 24, pl. 4, figs. 3, 6.

Diagnosis.—Platyconic shells with narrow venter; early whorls with sharp, falcate ribs, later whorls smooth; septal suture with narrow-stemmed bifid saddles, irregularly trifid L_1, and prominent suspensive lobe with a number of accessory lobes.

The genus includes *A. argentinum*, the "*Beudanticeras* cfr. *stoliczkai*" and "*Uhligella quercifolia*" of Bonarelli (**6**, pl. 3), and *Desmoceras jonesi* Gregory and Smith. It differs from *Cleoniceras* in the sharper ribs and absence of umbilical tubercle.

The Patagonian forms which were referred to the Albian genera *Beudanticeras* and *Cleoniceras* by Bonarelli occur in a bed below the horizon with *Sanmartinoceras patagonicum*, and, presumably, are Gargasian.

Although the genera *Aioloceras* and *Cleoniceras* are so similar there may be a slight hiatus between their ranges, for similar forms are not known from the *lowest* Albian. They may, therefore, possibly be homœomorphs in the same family.

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[17] *αἰόλος*, changing (i.e. in ornament).

AIOLOCERAS JONESI (Gregory and Smith).

1903. *Desmoceras jonesi* Gregory and Smith (**36**), p. 142, pl. 22.

The writer has not seen the type of this species, whose whorl-section has not been figured. But the description of the feature given by Gregory and Smith shows that it agrees in general with that of *A. argentinum* as it does in the other features of involution and ribbing.

In the ornamentation ceasing at an early stage the genus is more like *Cleoniceras* of the *cleon* type (d'Orbigny, **69**, pl. 84, fig. 1) than like *C. seunesi* Bonarelli.[18]

The ribbing ceases at a slightly earlier stage than in most of the forms figured by Bonarelli, though it is most like *A. argentinum*. In the density of ribbing it is nearer to the typical form of that species rather than to *A. argentinum* var. *meseticum* (Bonarelli) (**6**, p. 24, pl. 4, fig. 7).

Unfortunately the ventro-lateral ornamentation of the early whorls of *A. jonesi* is not known, so that it is not certain whether the species possessed the rather *Cleoniceras*-like ribs which develop on *A.* "*stoliczkai*" (Bonarelli non Kossmat) (**6**, pl. 3, fig. 4).

The species had been compared to the *Ammonites beudanti* of Stoliczka (= *Beudanticeras stoliczkai*, Kossmat sp.). But, as Spath (**101**, p. 52) has stated, it has nothing to do with *Beudanticeras*.

Locality.—Mitchell River (Bourke Museum Coll.).

Family ANCYLOCERATIDÆ Hyatt (emend. nov.).

Hyatt (**40**, p. 587) included in this family the trituberculate heteromorphic genera of the Neocomian and Aptian, together with such widely different forms as the Lower Albian *Pictetia*. Even if restricted to the trituberculate genera the family is certainly heterogeneous. Most of the forms may be of more or less direct lytoceratid origin; but such genera as, e.g., *Distoloceras* have a more complex ancestry. *Ancyloceras* (s. str.) is found in the Lower and in the lower portion of the Upper Bedoulian, but its immediate ancestor is unknown. In the Upper (possibly at the top of the Lower) Bedoulian the new genus *Australiceras* (v. inf.) appears and is replaced in the Lower Gargasian by *Tropæum*. The inner whorls of *Australiceras* have trituberculation essentially of the *Ancyloceras* type; and it is most probable that this genus is derived directly from *Ancyloceras*. *Tropæum* is non-tuberculate; but the trituberculate *Australiceras* type is continued into the Lower Gargasian by the group of *A.* (?) *gigas* J. de C. Sowerby (**92**, vol. 6, p. 188, pl. 593, fig. 2). A specimen of *A.* (?) aff. *gigas* in the Sedgwick Museum collection shows that the early whorls were trituberculate similar to the normal *Australiceras*. Further the tubercles are regained on the body-chamber; so that the only difference from the *jacki* group lies in the ancyloceratid type of coiling. However, as shown by specimens figured by Sinzow (**91**), *Tropæum* includes both crioceratid and ancyloceratid types so that there may be little genetic significance in this feature. But since only ancyloceratid types of trituberculate forms are known in the Lower Gargasian the group may be natural and require separation. Further the Upper Bedoulian group of "*Ancyloceras*" *urbani* Neumayr et Uhlig (**65**, pl. 50) may connect the *gigas* group directly with *Ancyloceras* thereby making it homœomorphous with *Australiceras* But whether the group is derived from *Ancyloceras* or *Australiceras* must be determined by detailed zonal collecting.

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[18] See Seunes (**88**), pl. 12, fig. 1.

Following immediately upon the disappearance of *Tropæum* the genus *Ammonitoceras*[19] makes its appearance In every feature of size, ribbing, and coiling, even to the possession of similar coarse costæ on the body-chamber (see **17**, pl 6), the two genera are identical. But the whorls of *Ammonitoceras* have bituberculation From these two criteria of direct replacement in time and perfect agreement but for tuberculation, it is believed that *Ammonitoceras* is directly derived from *Tropæum*. This implies that tuberculation is suddenly developed throughout, and not first produced on the body-chamber, spreading to earlier whorls in later species. Such abrupt changes are known in other cases; and it may be remarked that, as suggested below, the transition from *Australiceras* to *Tropæum* appears to be effected by the sudden loss of tuberculation.

It is therefore suggested that, instead of including such extraneous genera as *Crioceras* (s str), *Acrioceras* and *Distoloceras*, the family *Ancyloceratidæ* should be restricted to the trituberculate *Ancyloceras* and *Australiceras*, the non-tuberculate *Tropæum* and the bituberculate *Ammonitoceras* The relationship, if any, between the family and the micromorph genera *Toxoceratoides* and *Tonohamites* is yet to be decided.

Genus AUSTRALICERAS nov.

Genotype *Crioceras jacki* Etheridge Jr.

Diagnosis—Crioceratid shells with initial whorls trituberculate, later whorls without tubercles until the adult body-chamber which is trituberculate; costæ simple or bifurcating near the umbilical margin; septal suture I.U.L.E. with prominently bifid, relatively short-stemmed saddles and regularly trifid lobes.

The genus is proposed for a group of species richly represented in the Australian[20] Aptian but known also in India by *Crioceras australe* Waagen non Moore (**111**, p. 246, pl. 60, fig. 1); in Russia by *Crioceras ramoseptatum* Anthula (**3**, p. 127, pl. 14, fig. 4), *Crioceras gracile* Sinzow (**91**, p. 327), etc.; and in England. In England it has been recorded[21] from the *bodei* zone of the Bedoulian; while in India, from its association with *Parahoplitoides* and *Cheloniceras*, *A. australe* (Waagen non Moore) represents an Upper Bedoulian horizon. The genus is apparently represented in the Aptian portion of the Hilsbildungen of North Germany; for one of Neumayr and Uhlig's figures (**65**, pl. 53, fig. 2) appears to represent an *Australiceras* with the mediolateral tubercle diminishing at the transition to the non-tuberculate stage. None of the Australian species has such small tubercles.

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[19] See Dumas (**21**, p. 405, pl. 5). "*Ancyloceras*" *ackermanni* Krenkel, which was included in *Ammonitoceras* by Kilian, may however be an uncoiled *Cheloniceras* (**49**, p. 799).

[20] The genus is named from its typical development in this country.

From its known occurrence in the *bodei* zone and from the fact that it gives rise to *Tropæum*, *Australiceras* has a range of the whole Upper Bedoulian. Whether it ranges down into the Lower Bedoulian is unknown. If the *gigas* group is also to be included the genus ranges into the Lower Gargasian. No member of that group, however, is yet known in Australia.

The genus had been compared by Boule (**9**, p. 181) to *Diadochoceras* (*nodosocostatum* group).

AUSTRALICERAS JACKI (Etheridge fil.).

(Pl. XXXIV., fig. 2.)

1880 *Crioceras jackii* Etheridge Jr. (**23**), p. 305, pl. 17, figs. 55-58.
1892 *Crioceras australe* (pars) (non Moore) Etheridge Jr. (**42**), pl. 32, figs. 1, 2.
1909 *Crioceras jackii* (pars) Etheridge Jr. (**30**), pl. 37, fig. 1; pl. 38, fig. 3.
1913 *Crioceras australe* Richards (**82**), p. 182.

Sp. Chars.—Coiling crioceratid; whorl-section slightly depressed, subtriangular; costæ rectiradiate, slightly flexed; initial whorls with fine tubercles on every rib, later whorls with prominent ribs with blunt or thorn-like prominent tubercles, and interspersed non-tuberculate ribs

Dimensions.—

Holotype	77. 33. 43. 43.
(**30**, pl. 37, fig. 1)	90. 35. —. 48.
(**30**, pl. 38, fig. 3)	65. 36. —. 44.

Remarks.—The specific name was spelt *jackii* by Etheridge but is here emended to *jacki* to conform with the rules of nomenclature. Under this name Etheridge included many distinct forms, his interpretation of the "species" covering the genera *Australiceras* and *Tropæum* (pars). Specific distinctions are often difficult to define in heteromorphic genera; but several distinct groups are recognisable in the *Australiceras* of the "Rolling Downs."

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[21] Spath (**103**), p. 79. Recorded as *Ancyloceras* cf. *gracile* (Sinzow). The species is represented by four specimens in the Sedgwick Museum Collection, which have been examined by the writer.

The four figured specimens included above in the synonymy of this species differ in the number of ribs per whorl, but have common features in type of ribbing and tuberculation. A large number of specimens is required to determine the limits of variation. The specimen now figured has unusually large tubercles but must be retained in the species.

Localities.—Walsh River (Q.M. Coll.; holotype and other specimens); Hughenden (Q.M. Coll.); Woody Island, Hervey Bay (U.Q. Coll.)

AUSTRALICERAS IRREGULARE (Tenison-Woods).

(Pl. XXXVII, figs. 1 *a*, *b*.)

1882 *Crioceras irregulare* Tenison-Woods (**109**), p. 151, pl. 8, fig. 2.

1892 *Crioceras irregulare* Etheridge Jr. (**42**), p. 501, pl. 33, fig. 1; pl. 49, fig. 16.

1905 *Crioceras jackii* (pars) Etheridge Jr. (**28**), p. 14.

1909 *Crioceras jackii* (pars) Etheridge Jr. (**30**), p. 145.

Sp. Chars.—Coiling crioceratid; whorl-section circular; costæ wide, rounded; tubercles sharply defined.

Remarks.—Tenison-Woods's species was united with *A. jacki* by Etheridge, but it differs from it in whorl-section (not having a flattened dorsum) and in greater width of umbilicus. The figure of the holotype had the initial stage restored to show a widely open first whorl. But Etheridge (**28**, p. 14), who re-examined the type and developed the inner whorls, states that this restoration is quite unjustifiable and that the initial whorls were of the same type in coiling as those of *A. jacki* proper. On the specimen now figured the whorl previous to the one preserved (as shown by an impression on the matrix of the dorsum) was very close to the later whorl.

Localities.—Palmer River (M.M. Coll., holotype); Walsh River (Q.M. Coll., G.S.Q. Coll.).

AUSTRALICERAS aff. IRREGULARE (Tenison-Woods).

1909 *Crioceras jackii* (pars) Etheridge Jr. (**30**), pl. 35, fig. 1.

The large specimen figured by Etheridge has not been seen by the writer; but its initial whorls appear to be very similar to those of *A. irregulare*. The species becomes more closely coiled in later whorls. At the transition to the non-tuberculate stage the inner row of tubercles are still retained for a short period after the outer and median rows have disappeared.

Locality.—Walsh River (Q.M. Coll.).

AUSTRALICERAS ROBUSTUM sp. nov.

1909 *Crioceras jackii* (pars) Etheridge Jr. (**30**), pl. 32, fig. 1; pl. 33, fig. 1.

Sp. Chars.—Coiling crioceratid; whorls robust with early whorls septi-tuberculate; costæ fairly straight, rectiradiate; whorl-section depressed; septal suture very similar to that of *A. jacki*.

Dimensions.—

Holotype: ϕ 144. 37. 42. 40.
B.M. Coll.: 123. 41. 54. 38.

Remarks.—This species differs from other members of the genus in being prominently septi-tuberculate.[22] The holotype, being an internal mould, only shows the truncate nature of the cast of the tubercles, but a British Museum specimen, with test preserved in places, shows the septate condition very well. Otherwise, in ribbing, whorl-section and thorn-like tubercles it is very similar to *A. jacki* but has the tuberculate stage persisting to a larger diameter. In both the holotype and the British Museum specimen tuberculation ceases at a diameter of 90 mm. The depressed whorl-section is another important feature distinguishing it from the other species. A young specimen in the Queensland Museum collection has earliest whorls of the *jacki* type but is septi-tuberculate at a diameter of 30 mm.

Both A. *robustum* and *A jacki* are in some respects similar to *A. ramoseptatum* (Anthula) (**3**, p. 127, pl. 14, fig. 4), but differ in ribbing and tuberculation.

Localities.—South Central Queensland (A.M. Coll., holotype); Flinders River (B.M. Coll.); Walsh River (Q.M. Coll.).

AUSTRALICERAS GRACILE (Sinzow).

(Pl. XXXIV., fig. 4.)

1908 *Crioceras gracile* Sinzow (**91**), p. 327, pl. 18, fig. 1.
1909 *Crioceras jackii* (pars) Etheridge Jr. (**30**), pl 36, fig 1; pl. 37, fig. 2.

Sp. Chars.—Coiling crioceratid; whorl-section circular; costæ straight, thin and reclined; septal suture unknown.

Dimensions.—

Figd. (**30**), pl. 36, fig. 1. ϕ 220. 32. —. 47.
Figd. (**30**), pl. 36, fig. 2. ϕ 105. 36. —. 46.

Remarks.—Under the name *Crioceras gracile* Sinzow figured a number of specimens which may belong to more than one species of *Australiceras*. No. specimen appears to have been selected as holotype; but if we are to take his best specimen as such (**91**, pl. 18, fig. 1), the two specimens figured by Etheridge and quoted above must be regarded as belonging to the species. Etheridge's specimens differ from Sinzow's form in being more widely umbilicate and in having the tuberculate stage persisting to a greater diameter. But, considering the variation in crioceratid species, it is not advisable to erect a new specific name until more is known of the Australian forms.

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[22] Judging from the figure, however, the last two tuberculate ribs of the holotype of *A. jacki* may also be septi-tuberculate. This condition recalls the earlier *Ancyloceras*.

The species has circular whorl-section and numerous, thin, strongly reclined ribs. The English form recorded by Spath (**103**, p. 79) as *Ancyloceras* cf. *gracile* (specimens of which have been seen by the writer) has more compressed whorls and thicker ribs, more like another of Sinzow's forms (**91**, pl. 17, figs. 1-4). *A. gracile* bears considerable resemblance to *A. irregulare* which has thicker ribs; while the ribs of *A. graciloides* (Sinzow) (**91**, p. 328, pl. 20, figs. 1, 2) are not so reclined.

Localities.—Victoria Downs, Warrego (Q.M. Coll.); Walsh River (Q.M. and G.S.Q. Colls.).

AUSTRALICERAS TRANSIENTE sp. nov

(Pl. XXXIV., figs 3 *a*, *b*)

Sp. Chars.—Coiling crioceratid; whorl-section equidimensional, sides subparallel; costæ very faintly flexed, rectiradiate; tubercles faint, obtusely conical.

Dimensions.—Holotype: 84. 39. 40. 39.

Remarks.—On the holotype there are about 70 costæ to the last whorl. Tuberculation is not very marked, especially on the first half-whorl exposed. The species is perhaps most similar to *A. jacki* but is distinguished by more numerous costæ, sub-parallel sides, and faintness of tubercles. The tuberculate stage ceases on the holotype at a diameter of 50 mm. The septal suture is little known but has apparently broad-stemmed lobes and saddles.

Locality.—Walsh River (Q.M. Coll.).

AUSTRALICERAS LAMPROS (Etheridge fil.).

(Pl. XXXV., figs. 1 *a*, *b*.)

1909 *Crioceras lampros* Etheridge Jr. (**30**), p. 157, pl. 48.

Sp. Chars.—Coiling crioceratid; whorls massive; whorl-section subtriangular, almost equidimensional; rectiradiate; costæ thin, straight, close together on earlier whorls, coarse and widely separated on the body-chamber; initial and final stages trituberculate; septal sutures interlocking, with multidentate branches.

Dimensions.—

B.M. Coll. (figured): 340 (224). 35. 38. 41.
B.M. Coll. (25366): 325. 36. —. 44.

Remarks—The specimen upon which Etheridge founded this species consisted of a body-chamber, with very coarse, trituberculate costæ, in the possession of the Geological Survey of Queensland Recently, however, the earlier portion of the specimen has been found in this collection, and it is hoped that the complete holotype may be figured in a future paper The earlier whorls are of the type shown by the fine specimen figured on Plate II.

The holotype has not the initial whorls preserved, but it is sufficiently complete to show that the early trituberculation ceased at a diameter of 55 mm The initial whorls of the specimen now figured are also not preserved but, at a diameter of about 45 mm (i e, the earliest stage preserved), there are faint suggestions of tubercles There is thus a difference at which, in these two specimens, the initial tuberculation ceases, but there is every reason to believe that the specimens are conspecific

A lampros is very like certain forms of *Tropæum* particularly the group of *T bowerbanki* (J de C Sowerby) (**94,** p 410 pl 34 fig 1), *T hillsi* (J de C Sowerby) (**93,** p 339 pl 15, figs 1 2), and *T cadoceriforme* (Sinzow) (**93,** pl 21, fig 3) The last named species has a septal suture apparently identical with that of *A lampros* It is probable that this group of *Tropæum* is derived from the present species

Localities—Queensland ? (G S Q Coll, holotype), Glendower Station, Flinders River (B M Coll)

Genus TROPÆUM J de C Sowerby

The name *Tropæum* proposed in 1837 by J de C Sowerby (**94,** p 409), but discredited in the same paper, was revived in 1900 by Hyatt (**40,** p 571) The genotype is *Crioceratites bowerbanki* J de C Sowerby and although the geno holotype has not the initial whorls preserved yet, as shown by a young specimen in the Sedgwick Museum Collection, the species is non-tuberculate The genus is derived from *Australiceras*, with which it is identical in coiling, costation, and septal sutures, but it appears to have developed along several lines—*T arcticum* being related to *A transiente* and *T rarum* to *A* aff *irregulare* In all the species of *Australiceras* (with the exception perhaps of *A robustum*) tuberculation ceases about the same diameter of whorl In some forms all three tubercles disappear simultaneously (**30,** pl 37, fig 2), while in others the outer (**30,** pl 38, fig 3) or the inner (**30,** pl 35, fig 1) tubercle may be retained somewhat later than the other two *A transiente* agrees in every feature with *T arcticum* except for tuberculation, and it is noteworthy that the tubercles on the former species are faint Further, the tubercles on the earliest part visible of the holotype are fainter than on the last two tuberculate ribs, suggesting that the change from *Australiceras* to *Tropæum* was achieved by the abrupt cessation of tuberculation, and not that the tuberculate stage was driven further and further towards the origin in successively later species.

Tropæum is known in Europe in the two zones *bowerbanki* and *hillsi* of the Lower Gargasian.

TROPÆUM AUSTRALE (Moore).

1870 *Crioceras australe* Moore (**64**), p. 257, pl. 15, fig. 3.

1892 *Crioceras australe* Etheridge Jr., pl. 31, fig. 1.

Sp. Chars.—Coiling crioceratid, whorls massive. Whorl-section equidimensional. Costæ very numerous, thin and close together, rectiradiate to slightly reclined. Coarse costæ of the body-chamber regular and smooth.

Remarks.—By kind permission of the council of the Royal Literary and Philosophical Society of Bath (England), the writer was recently permitted to examine the collections of the Bath Museum in search for Moore's missing types of Australian Cretaceous fossils. The type of *Crioceras australe* has been lost and no record of it could be found.[23]

On the grounds of insufficient description and loss of type, Etheridge (**30**, p. 136) proposed that Moore's name should be abandoned. But the other figures of ammonites (Jurassic) given by Moore give a true representation of their species, and there is no reason to suppose that the same was not true of *Crioceras australe.* Further, there is one form in the Roma Series[24] which agrees in features with the species as figured by Moore. It is therefore not permissible to reject the specific name *australe* . and the writer now chooses a specimen figured by Etheridge[25] in 1892 as the neotype of the species.

The neotype is a large specimen and one of the most complete crioceratids recorded from the series. The initial whorls are, unfortunately, not preserved; but since the coarse costæ of the body-chamber are non-tuberculate the species is to be placed in *Tropæum* rather than in *Australiceras.*

T. australe is a member of the *bowerbanki* group (**94**, p. 410, pl. 34, fig. 1), but differs from Sowerby's species in its thinner ribs (which are more numerous) and in whorl-section (slightly). Some of the forms figured as *Crioceras bowerbanki* by Sinzow (**91**) are very similar.

Crioceras australe Waagen[26] non Moore (**111**, p. 246, pl. 60, fig. 1) is generically distinct from the species, being an *Australiceras.* Krenkel, quite unjustifiably, has identified the species as a *Cheloniceras* (*martini* group) (**54**, p. 162). Lemoine (**55**, p. 385) has correctly stated the form to be Aptian.

Localities.—Upper Maranoa River (holotype, specimen destroyed); Walsh River (neotype; Q.M. Coll.).

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[23] The writer has since learnt that these specimens perished in the Garden Palace Fire of London.

[24] From its locality (Upper Maranoa River) Moore's specimen must have been from the Roma Series.

[25] Etheridge (**42**), pl. 31, fig. 1. A plaster cast of the specimen in the B.M. Collection has been examined by the writer.

[26] The writer has seen Waagen's type which represents a species not known in Australia.

TROPÆUM LEPTUM (Etheridge fil.).

1909 *Crioceras leptus* Etheridge Jr. (**30**), p. 143, pl. 30.

Sp. Chars.—Coiling crioceratid; whorls compressed, with very numerous, narrow, rectiradiate costæ; whorl-section sub-triangular.

Dimensions.—Holotype, θ.ϕ. 73. 77.

Remarks.—This species differs from all other forms in the "Rolling Downs" in its compression. The inner whorls are unknown so that it may even be an *Australiceras*. It is very similar in lateral view to *T. bowerbanki* (Neumayr et Uhlig) non Sowerby (**65,** pl. 53, fig. 1), whose whorl-section is not known. *T. spp.* of Neumayr and Uhlig (**65,** pl. 54) are similar but not as compressed. *T. percostatum* Gabb (**35,** vol. i., pl. 16) has thicker ribs.

Locality.—Lind River (G.S.Q. Coll., holotype).

TROPÆUM ARCTICUM (Stolley).

1909 *Crioceras jackii* (pars) Etheridge Jr. (**30**), pl. 32, fig. 2; pl. 34, fig. 1.
1911 *Crioceras arcticum* Stolley (**107**), p. 16, pl. 1, fig. 1 (also text-figs. 1, 2).

Sp. Chars.—Coiling crioceratid; whorls with about 65 simple rounded costæ, slightly flexiradiate, separated by sulci of approximately the same width; aperture almost equidimensional.

Dimensions.—(**30**) Pl. 34, fig. 1: ϕ 118. 38. 38. 42.

The perfect agreement of the specimen figured by Etheridge with Stolley's holotype from the Gargasian of Spitzbergen is a matter of considerable interest; for the species otherwise has not been recorded beyond Spitzbergen. The dimensions, course of the ribbing, type and intensity of the costæ are precisely similar. Further there is the same number of ribs per whorl. The holotype is somewhat crushed so that Stolley was unable to give the shape of the whorl-section exactly; but it appears to have been approximately equidimensional as in Etheridge's specimen.

T. arcticum agrees perfectly with *Australiceras transiente* in every feature except tuberculation; and there is no doubt a close connection between the two species.

Locality.—Roma (Q.M. Coll.).

TROPÆUM UNDATUM sp. nov.

1909 *Crioceras jackii* (pars) Etheridge Jr. (**30**), pl. 31; pl. 38, figs. 4, 5.
1911 *Crioceras sp. nov.* (aff. *arcticum*) Stolley (**107**), p. 19, pl. 2, fig. 1.

Sp. Chars.—Coiling crioceratid; whorl with about 50 almost straight prorsiradiate ribs; aperture subcircular.

Dimensions.—

Holotype (Q.M. Coll.): ϕ 320. 32. 36. 44.
Paratype (G.S.Q. Coll.): ϕ 85. 33. 31. 44.

The larger of Etheridge's two specimens (pl. 31) is selected as holotype. The main features of the species are the regularly coiled, equidimensional whorls with prominent rounded costæ in the young stage (becoming thinner and wider apart with age), which continue with slight forward inclination across the sides. The septal suture is unknown. Stolley's Spitzbergen specimen appears to be identical with this species though the state of preservation is unsatisfactory.

The closest known form is undoubtedly *T. arcticum* Stolley, which differs in the greater number of costæ per whorl and their slight curvature *T. simbirskense*[27] Jasikowski is somewhat similar but more loosely coiled.

Localities.—

Holotype Q.M. Coll.): Queensland ! (G.S.Q. Coll.): Walsh River.

TROPÆUM RARUM sp. nov.

(Pl. XXXVI., figs. 1 *a*, *b*.)

Sp. Chars.—Coiling crioceratid; whorls massive, depressed, whorl-section almost semicircular; costæ wide, rectiradiate.

Dimensions.—

Holotype: 177 (164). 38. 43. 39.

B.M. Coll. (25358): 220. 40. 46. 39.

Remarks.—This species is very similar to the *Australiceras* aff. *irregulare*, from which it may be derived. It differs from other Australian species of *Tropæum* in its depressed whorl-section. *T. hillsi* (J. de C. Sowerby) (**93**, p. 339, pl. 15, figs. 1, 2), particularly the type figured by Keeping (p. 91, pl. 2), is probably the most similar European form, especially in whorl-section.

Localities.—Walsh River (Q.M. Coll., holotype); Flinders River (B.M. Coll.).

Genus TOXOCERATOIDES Spath.

TOXOCERATOIDES TAYLORI (Etheridge fil.)

1892 *Ancyloceras taylori* Etheridge Jr. (**42**), p. 498, pl. 42, fig. 13.
non 1909 *Crioceras taylori* Etheridge Jr. (**30**).

Sp. Chars.—Micromorph, coiling ancyloceratid; non-tuberculate; costæ broad; cross-section sub-circular, slightly compressed.

Remarks.—Two specimens of this species are known—the holotype from the Walsh River and a fragmentary specimen, associated with *Australiceras robustum*, from the same locality. Both specimens are in the collection of the Queensland Museum.

[27] See Sinzow (90), pl. 6, fig. 1. The species was wrongly identified as *Australiceras gracile* by Kilian (48, p. 355).

Toxoceratoides includes both tuberculate and non-tuberculate species, the latter no doubt derived from the former. Forms like *T. royerianus* (d'Orbigny) (**69**, p. 481, pl. 118, figs. 7-11) have trituberculation; in others, e.g. *T. royeri* (v. Koenen pars, non d'Orbigny) (**51**, p. 399, pl. 37, fig. 7), the row of umbilical tubercles has disappeared. *T. taylori*, in being non-tuberculate, agrees with *T. rotundus* (Phillips);[28] but a closer relationship exists with *T. æquicingulatus* (von Koenen) (**51**, p. 394, pl. 37, figs. 5, 6). Von Koenen's species has faint ventro-lateral tubercles, which are not present on *T. taylori*, otherwise the agreement is very close.

As mentioned below, there is unfortunately a very close resemblance between *T. taylori* and *Labeceras bryani* which occurs at another horizon in the "Rolling Downs."

Locality.—Walsh River (Q.M. Coll.).

C.—ALBIAN SPECIES.

Family DESMOCERATIDÆ Zittel.

This family has been critically revised by Dr. Spath in recent papers (**98** and **101**).

In tracing the generic succession in the *Desmoceratidæ* the apparent continuity of a puzosid stock is particularly noticeable The Upper Barremian to Lower Aptian *Melchiorites* is replaced in the Aptian (? Lower Gargasian) by *Uhligella* (s. str.). *Puzosia* itself appears in the Lower Albian—e.g. *P. kiliani* Fallot, *P. quenstedti* (Parona and Bonarelli), etc.—and continues into the Cenomanian where *Austiniceras* makes its appearance. All three genera have a strong community of character (in ornament, coiling, constrictions, and septal suture); and, since they replace one another in time, most probably form a lineage.[29] Inflated forms (*Pleuropachydiscus*, *Callizoniceras*, *Desmoceras*, etc.) have been produced from time to time, and *Desmoceras*, e.g., may be connected with *Puzosia* via the group of *P.* cf. *emerici* (Parona and Bonarelli) non Raspail sp. (**71**, p. 80, pl. 11, figs. 1, 2). Such inflated forms, though often of long duration, were apparently not very important as nuclei from which other genera developed. Such specialised genera as, e.g., *Hauericeras* and *Pachydiscus* are also probable offshoots from the puzosid lineage.

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[28] Phillips (**75**), pl. 1, fig. 24. The species, specimens of which have been collected by the writer at Speeton, has not been adequately figured.

[29] Dr. Spath, however, doubts whether there is a connection between *Puzosia* and *Uhligella* (**101**, p. 34); but the writer believes that the type *Uhligella* is very close to *Puzosia*. The occurrence of the *Uhligella* type of ornament on a rare form of *Puzosia communis* as mentioned by Spath (**101**, p. 49) is of interest in this connection. The other possible explanation of the family *Desmoceratidæ* would be that it is an assemblage of homœomorphous genera repeatedly derived from *Phylloceratidæ*, etc.; and, while the writer believes that some forms have been thus derived, a central puzosid lineage from which other genera developed is regarded as the most satisfactory explanation of the majority of the desmoceratids.

Spath (**98**, p. 128) has suggested that the genus *Parapuzosia* is not directly developed from *Austiniceras* and points to "*Puzosia*" *curvatisulcata* Chatwin and Withers as a more nearly related form. But it is admitted later that this species may also be an *Austiniceras*; and the writer believes that *Parapuzosia* is probably the end form of the lineage.

The relationships of *Beudanticeras* Hitzel are not clear. Within the genus there are two groups represented by forms with narrow and wide stems respectively to the septal saddles. This was realised by Jacob (**45**), who placed them in different but ineligible genera. Whether, therefore, the genus had a dual origin is a matter for investigation. Spath (**101**, p. 37) believes *Beudanticeras* to be a special "wave" of phylloceratids; but the writer believes that, at least in part, the group is derived from *Uhligella*. The ornamentation of such forms as *B. dupinianum* d'Orbigny is very like that of *Uhligella* on the one hand and *Cleoniceras* on the other.

It is most probable that *Desmoceratidæ* were derived from *Phylloceratidæ*, particularly owing to the nature of the septal suture. But the close approximation of such forms as *Desmoceras* and certain *Parapachydiscus*—e.g. *P. umtafunensis* (Crick ms.) Spath (**98**, p. 133, pl. 9, fig. 4—to *Lytoceratidæ* (*Gaudryceras* and *Tetragonites*) makes distinctions very difficult, particularly since little is known of developmental details of the species in the various genera. Spath has suggested (**101**, p. 33) that *Desmoceratidæ* as known at present may even contain some derivatives of *Lytoceratidæ*.

Genus PUZOSIA Bayle.

PUZOSIA LONGMANI sp. nov.[30]

(Pl. XXXVII, fig. 5; Pl. XXXIX, figs. 1 *a*, *b*.)

Sp. Chars.—Coiling serpental, subangustumbilicate; sides slightly convergent (sub-parallel), venter evenly arched; gradumbilicate; seven or eight faint constrictions per whorl, each slightly flexed and with a very small (almost negligible) peripheral projection; densiseptate; septal suture with irregularly bifid saddles and slightly irregularly trifid lobes.

Dimensions.—Holotype (Q.M. Coll.): 105 (94). 47. 34. 24.

Remarks.—Only the one specimen (of unusually large size) is known at present. The most similar species is *P. communis* Spath (**101**, p. 47, pl. 2, fig. 3), which has the same dimensions and agrees almost perfectly in whorl-section and type of septal suture. *P. longmani*, however, is gradumbilicate whereas the umbilical shoulder in *P. communis* is rounded; further, the constrictions are less prominent and the saddles of the septal sutures have narrower stems. *P. sharpei* Spath (**101**, p. 46, pl. 1, figs. 11, 12) has a wider umbilicus and fewer constrictions. *P. mayoriana* (d'Orbigny) (**69**, p. 267, pl. 79) has a similar (though wider) gradumbilicus but fewer constrictions and there is a deeper suspensive lobe to the septal suture. Further the constrictions have a very pronounced peripheral projection. *P. mayoriana* var. *natalensis* Crick (**16**, p. 213, pl. 14, fig. 4) is closer in the faintness of constrictions; but whorl-section and the peripheral projection of the constrictions are still different. The huge *P.* (?) *subtilis* Crick (**16**, p. 217, pl. 14, fig. 5) has strongly prorsiradiate constrictions but agrees fairly well otherwise. The constrictions of *P. furnitana* (Pervinquière) (**73**, p. 157, pl. 6, figs. 27, 28), *P. crebrisulcata* Kossmat, and *P. odiense* Kossmat (**52. c**, pl. 17, fig. 4; pl. 16, fig. 5) have different curvature. The Lower Cenomanian *P. planulata* (J. de C. Sowerby) (**92**, vol. vi., p. 134, pl. 570, fig. 5) and *P. octosulcata* (Sharpe) (**89**, p. 42, pl. xix., fig. 3) differ in dimensions.

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[30] In honour of Mr. H. A. Longman, Director of the Queensland Museum.

In the Lower Albian there are several groups of *Puzosia*; and the group of *P. quenstedti* (Parona and Bonarelli)[31] (**71**, p. 81, pl. 11, fig. 3) and *P. kiliani* Fallot (**32**, p. 513, pl. 1, figs. 1-3) bears considerable resemblance to the present species. The writer believes that *P. quenstedti* is ancestral to both *P. mayoriana* and *P. communis*.

Locality.—Barcoo River (Q.M. Coll.).

Genus BEUDANTICERAS Hitzel.

BEUDANTICERAS FLINDERSI (McCoy).

1865 *Ammonites flindersi* McCoy (**58**), p. 51.
1865 *Ammonites flindersi* McCoy (**59**), p. 334.
1867 *Ammonites flindersi* McCoy (**60**), p. 196.
1868 *Ammonites flindersi* McCoy (**61**), p. 42.
1878 *Ammonites beudanti* var. *mitchelli* Etheridge (Senior) (**22**), p. 345, pl. 23, fig. 1 only.
1892 *Haploceras flindersi* Etheridge Jr. (**42**), p. 494, pl. 30, figs. 1, 2 only.
1902 *Haploceras flindersi* Etheridge Jr. (**26**), p. 31.

Sp. Chars.—Coiling oligogyral, subangustumbilicate; sides flattened, venter evenly arched, whorl-section subovate; gradumbilicate; fine subfalciform striæ radially directed, sometimes also faint sub-costæ; constrictions rare and faint; septal suture with irregularly trifid external lobe, narrow-stemmed saddles and prominent suspensive lobe.

Dimensions.—

Figured Etheridge (**22**), pl. 23, fig. 1: ϕ 130. 44. 28. 29.

Q.M. Coll. $\begin{cases} 187. & 46. & 28. & 29. \\ 142. & 43. & 27. & 28. \end{cases}$

Remarks.—Etheridge jr. (**42**, p. 495), who examined McCoy's type, believed this species to be identical with *Ammonites beudanti* var. *mitchelli*

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[31] *P. mayoriana* Bayle non d'Orbigny sp. (**69**, vol. iv., pl. 45, figs. 6-8) is probably this species as Spath has indicated (**101**, p. 45).

Etheridge (Senior). This identification is confirmed by the present writer, who hopes to figure McCoy's types of Australian Cretaceous invertebrates in a forthcoming paper.

Spath (**101**, p. 52) believed that the species, as represented by Etheridge's original figure, is not a *Beudanticeras*. With this view the writer disagrees. Within the genus there are two groups—one, typified by *B. beudanti* (Brongniart),[32] having narrow-stemmed saddles; the other, typified by *B. lævigatum* (J. de C. Sowerby),[33] with wide stems. Both groups appear in the Lower and continue to the Upper Albian. *B. flindersi* belongs to the first (type) group. The genus is really of little use for the zonal correlation of distant areas (unless identical species occur) owing to its long duration and rather conservative characters.

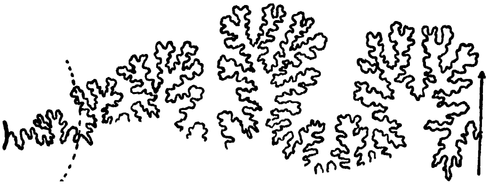

Fig. 1 – Septal suture of *Beudanticeras flindersi* (McCoy). Specimen from Hughenden (Q.M. Coll.). Nat. size.

The septal suture of *B. flindersi*, with its prominent suspensive lobe, agrees fairly well with that of *B. beudanti* and *B. sphærotum* (Seeley);[34] but the Lower Albian *B. convergens* (Jacob) (**44**, p. 29, pl. 2, figs. 24-26) also possesses this feature, although it is apparently absent from *B. walleranti* (Jacob) (**44**, p. 31, pl. 3, figs. 1-4) The ornament never becomes as prominent as in *B. rebouli* (Jacob) (**44**, p. 32, pl. 4, figs. 1-5), although a Queensland Museum specimen has faint costæ on the body-chamber similar to that on a specimen of *B. walleranti* figured by Jacob (**44**, pl. 3. fig. 2). The venter is not narrowed as in *B. beudanti*, but is more like that of *B. sphærotum*, which is perhaps the nearest European species. The Indian *B. stoliczkai* Kossmat (**52**, p. 119, pl. 18, fig. 6) is probably the most similar species, but the suspensive lobe is more prominent. Further, although several young specimens of *B. flindersi* have been examined by the writer, none have shown the prominent constrictions which are developed in the young stages of *B. stoliczkai*.

Localities.—Base of Walker's Tableland, Flinders River (N.M. Coll., holotype); Hughenden Station, Flinders River (R.D. Coll.); Hughenden (Q.M. Coll.).

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[32] Brongniart (**18**), pp. 95, 99, 394, pl. 7, fig. 2. See also Spath (**101**), p. 49.

[33] J. de C. Sowerby (**92**), vol. vi., p. 93, pl. 549, fig. 1. See also Spath (**101**), p. 55.

[34] Type figured by Spath (**101**), p. 53, pl. 3, fig. 1.

BEUDANTICERAS (?) DAINTREEI (Etheridge).

1872 ***Ammonites daintreei*** **Etheridge (22), p. 346, pl. 24.**
1892 ***Haploceras daintreei*** **Etheridge Jr. (42), p. 495, pl. 29, figs. 1-3.**
1901 ***Haploceras daintreei*** **Etheridge Jr. (24), p. 30, pl. 1, fig. 3.**
1902 ***Haploceras daintreei*** **Etheridge Jr. (26), p. 49, pl. 7, figs. 2-4.**
? *non* 1902 ***Haploceras daintreei*** **Etheridge Jr. (25), p. 44, pl. 7, fig. 1.**
non 1913 ***Haploceras daintreei*** **Etheridge Jr. (31), p. 23.**
non 1921 ***Beudanticeras daintreei*** **Bonarelli (6), p. 23, pl. 3, fig. 5.**

Sp. Chars.—Coiling oligogyral, sublatumbilicate, subgradumbilicate; sides convergent, venter arched, whorl-section ovate; subcostate, with intermittent constrictions; septal suture complex, with many auxiliary lobes and prominent suspensive lobe.

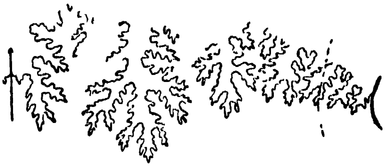

Fig. 2. Septal suture of *Beudanticeras* (?) *daintreei* (Etheridge). Specimen from Hughendon (Q.M. Coll.). Nat. size.

Dimensions.—

Holotype (R.D. Coll.):	ϕ	98. 43. 30. 35.
Figured (**26**), pl. vii.:	ϕ	135. 42. 32. 34.
Q.M. Coll.:		124. 45. 31. 31.
		96. 44. 34. 33.

Remarks.—This species is rather difficult to place generically. In many respects it resembles the Upper Aptian *Uhligella*, particularly the group of *U. sequenzæ* (Coquand) (**15,** p. 40, pl. 11, fig. 10) and *U. stremmei* (Zwierzycki) (**116,** p. 69, pl. vii., figs. 3, 4). It has relationships with both *Puzosia* and *Beudanticeras* and may indeed be a separate offshoot from the former, parallel to *Beudanticeras.* The ornament is distinctly puzosid although certain groups of *Beudanticeras* (e.g. *B. rebouli* Jacob sp.) are prominently costate. The inflation of the shell is also reminiscent of *Puzosia.*

The South Australian specimen figured by Etheridge (**25,** p. 44, pl. 7, fig. 1) may be a *Parahoplitoides* as mentioned above. Etheridge (**31,** p. 23) also recorded the species doubtfully from the Gin Gin chalk (Lower Santonian) of Western Australia. These specimens, however, seen by the writer, belong to *Parapuzosia.* The Aptian "*Beudanticeras daintreei*" figured by Bonarelli from Patagonia is not this species and probably belongs to *Uhligella* or *Aioloceras.*

Localities.—Hughenden (R.D. Coll., holotype); Hughenden (Q.M. Coll.); Yandamah Creek (M.G.M. Coll.).

BEUDANTICERAS (?) SUTHERLANDI (Etheridge).

1872 *Ammonites sutherlandi* Etheridge (**23**), p. 345, pl. 21, fig. 4.
1892 *Ammonites* (*Haploceras*) *sutherlandi* Etheridge Jr. (**42**), p. 496, pl. 29, fig. 4.

The writer has not seen an example of this species. It appears to be an abnormally involute *Beudanticeras,* and in the absence of further evidence is tentatively placed in that genus Etheridge (**42**, p. 496) compared it with *Ammonites cassida* Raspail which is a Hauterivian *Barremites* and quite distinct.

Locality.—Marathon (R.D. Coll., holotype).

Family DIPOLOCERATIDÆ Spath.

Genus PROHYSTEROCERAS Spath.

PROHYSTEROCERAS RICHARDSI sp. nov.[35]

(Pl. XXXVI., fig. 2; pl. XXXVIII., figs. 1 *a*, *b*.)

1909 *Schloenbachia rostratus* (J. Sowerby) Etheridge Jr. (pars) (**30**), pl. 67, fig. 1 only.

Sp. Chars.—Coiling serpental, sublatumbilicate; alticarinate; sides almost flat, venter planicarinate, whorl-section approximately square; costæ broad, rounded, and very slightly flexed, bifurcating at the umbilical edge where, in the young stage, there is a prominent tubercle (bullate) which diminishes with age; ventro-lateral tubercle barely developed, but with faint spiral grooving; septal suture with bifid saddles and regularly trifid lobes, L_1 much shallower than EL.

Dimensions.—

Holotype (Q.M. Coll.):	145.	42.	30.	41.
	100.	44.	33.	43.
Figured (**30**), pl. 67, fig. 1:	ϕ 106.	33.	—.	43.
(F.W.W. Coll.):	84.	32.	33.	46.

Remarks.—The species belongs to the group of quadrate-whorled forms with planicarinate venter characteristic of the *varicosus* and upper *orbignyi* zones. *P. richardsi*[36] actually appears to be present at Folkestone. *P. goodhalli* (J. Sowerby) (**92**, vol. ii., p. 100, pl. 255) is very similar but more compressed; and the Madagascan species, erroneously identified by Boule, Lemoine and Thevenin[37] as *Schloenbachia* (*Mortoniceras*) *bourchardiana* (d'Orbigny) appears to differ only in having slightly more ribs per whorl. *P. burckhardti* (Böse) (**7**, p. 61, pl. 1, figs. 1, 2, 4, 5) is rather similar but more compressed and the costæ are more flexed. *P. balmatianum* Pictet (**79**, p. 97, pl. 9, fig. 1) has a similar whorl-section but there are considerable differences in ornamentation, particularly in the development of the ventro-lateral tubercle. The Indian *P. propinquum* (Stoliczka) (**104**, p. 53, pl. 31, figs. 1-2) is similar but differs in whorl-section and in the peculiar decline of ornament on the body-chamber. *P. decipiens* Spath (**97**, p. 145, pl. 4, fig. 13) has certain points of resemblance but the ribs are straighter and rarely bifurcate.

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[35] In honour of Professor H. C. Richards.

[36] Represented by a specimen in the Sedgwick Museum Collection.

[37] Boule, Lemoine and Thevenin (**10**), p. 39, pl. 9, fig. 11. D'Orbigny's species is a *Dipoloceras.*

The septal suture of *P. richardsi* is peculiar in the shallowness of L_1, a condition reminiscent of the *Dipoloceras* and *Inflaticeras* type of suture.

Localities.—"Toliness," Augathella (Q.M. Coll., holotype); South Central Queensland (A.M. Coll.); 23 miles S.W. of Tambo (west bank of Ward River) (F.W.W. Coll.).

PROHYSTEROCERAS RICHARDSI var. NITIDUM nov.

(Pl. XXXVI., fig. 3.)

1909 *Schloenbachia rostratus* var. *antipodeus* Etheridge Jr. (non olim) (**30**), p. 237, pl. 67, figs. 3, 4.

The small form figured by Etheridge differs from *P. richardsi* proper mainly in having sharper ribs, and may be separated as a variety of that species, Etheridge's specimen being taken as the type. It has nothing to do with Etheridge's *Hystrichoceras* (?) *antipodeus* from Point Charles which belongs to another genus. The measurements given here are taken from a plaster cast of the holotype kindly supplied by the Australian Museum.

Dimensions.—Holotype: 44. 30. 35. 47.

Locality.—South Central Queensland (A.M. Coll., holotype).

PROHYSTEROCERAS ANGOLAENSE (Boule, Lemoine et Thevenin).

1892 *Ammonites* (*Schloenbachia*) *inflatus* Etheridge Jr. (non Sowerby) (**42**), p. 493, pl. 34, figs. 1-3.

1907 *Schloenbachia inflata* var. *angolaensis* Boule, Lemoine and Thevenin (**10**), p. 41, text-fig. 21.

1909 *Schloenbachia rostratus* Etheridge Jr. (non Sowerby) pars. (**30**), pl. 65; pl. 66, fig. 1 only.

P. angolaense is undoubtedly very closely related to *P. richardsi*, differing in the wider spacing of the ribs and probably in the peculiar ventro-lateral tubercle which develops on later whorls. The writer has not found it possible to separate specifically the Queensland and Madagascan forms; and this is of interest in view of the presence of other species in Madagascar closely allied to P. *richardsi*.

Boule, Lemoine and Thevenin's treatment* of *Inflaticeras æquatoriale* (Kossmat) included several species of both *Inflaticeras* and *Prohysteroceras*. One of the latter (**10**, pl. 9, figs. 8, 9) is probably related to *P. richardsi* and, in its ventro-lateral tubercle, develops parallel to *P. angolaense*.

The group of species which develops this peculiar tuberculation on advanced whorls is characteristic of the Upper *orbignyi* and the *varicosus* zones in the Folkestone section. In the later costæ not bifurcating the group apparently is somewhat parallel to *Elobiceras*. Spath (**97**, p. 101) included Etheridge's specimen[38] in *Inflaticeras* (= *Subschloenbachia*); but although the group is transitional to *Inflaticeras* it is more advisable to leave the species in *Prohysteroceras*.

Locality.—South Central Queensland (A.M. Coll.); Glanmire Block, near Tambo (G.S.Q. Coll.).

Genus INFLATICERAS Stieler.

INFLATICERAS SP. NOV.

1909 *Schloenbachia rostratus* Etheridge Jr. (non Sowerby), pars, (**30**), pl. 66, fig. 2; pl. 67, fig. 2 only.

This species is only known from fragments at present. It belongs to a group of forms characteristic of the *varicosus* zone and of which *Schloenbachia rostrata* Bayle non Sowerby sp. (**5**, pl. 91) may be taken as the type. This group differs from later species of *Inflaticeras* (*rostrata* group, etc.) in the concentric ornament being developed on the sides also, and not confined to the ventro-lateral tubercle. It probably leads directly to the group of *I. perinflata* Spath[39] in which, besides having the concentric ornament only on the outer tubercle, there are differences in the duplication of the ventro-lateral and prominence of the medio-lateral tubercle.

This group, unfortunately, is inadequately figured and the whorl-section of Bayle's specimen is unknown.

A specimen in the Australian Museum Collection shows that, at least at a whorl thickness of 30 mm., the ventro-lateral tubercle had not developed; so that the group has very early features of *Inflaticeras*. On a badly worn specimen in the writer's collection bifurcation of costæ ceases at a diameter of about 145 mm.

Localities.—South Central Queensland (A.M. Coll.); 23 miles S.W. of Tambo, west bank of Ward River (F.W.W. Coll.).

Family HAMITIDÆ Hyatt (emend. Spath).

Three names are in common use for the costate non-tuberculate hamitids of the Albian—*Hamites* Parkinson, *Torneutoceras* Hyatt and *Helicoceras* d'Orbigny; but the significance of each name is not definite. *Hamites* includes the groups of *attenuatus* J. Sowerby (small "Lower" Gault forms) and *maximus* J. Sowerby (large forms of the "Upper" Gault), though little is known of species from the *delaruei* and lower *cornutus* zones.

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[38] Etheridge (**30**), pl. 65.

[39] Spath (**97**), p. 113; holotype, Pictet and Campiche (**78**), pl. 22, fig. 3.

The Upper Albian forms have delicate attenuated shells with either spiral or "ptychoceratoid" initial whorls. For the group of *Hamites attenuatus* d'Orbigny non Sowerby (**69**, p. 533, pl. 131, figs. 9-13), Hyatt (**40**, p. 586) proposed the genus *Torneutoceras*, no definition being given. D'Orbigny's figure is apparently somewhat idealised; but the species differs from the *maximus* group in the costæ being less inclined and not continued across the dorsum, and (possibly) in the "ptychoceratoid" beginning. Unless a division into two such groups has a zonal significance there is little occasion for separating "*Torneutoceras*"; for the costal distinction is not particularly momentous and, with the known variation in initial whorls of these forms, the "ptychoceratoid" character is of doubtful importance. When more complete individuals of *H. venetzianus* Pictet (**79**, p. 134, pl. 14, fig. 6) are known this may have to be separated as a new genus, but it is advisable to retain *H. attenuatus* d'Orbigny non Sowerby in *Hamites*.

There is a constant tendency in the normally coiled ammonites towards asymmetry, sometimes shown in the disagreement between two halves of a septal suture, in the siphuncle deviating from the median line, in the alternation of ventro-lateral tubercles or in a tendency for the coiling to vary from a plane. In *Hamites* with its delicate initial whorls so far apart such a tendency must lead to helicoid forms; and a species may include forms some with uniplanous and some with helicoid initial whorls. But *Helicoceras* d'Orbigny (**69**, p. 611; see Spath **97**, p. 149) has been proposed for the helicoid hamitids differing from *Hamites* only in coiling. Such a genus must have little systematic value and very probably may have to be abandoned. The genus *Turrilitoides* Spath (**99**, p. 76), however, which is also a non-tuberculate hamitid, covers a natural group.

Smooth developments of the *Hamitidæ* appear in the Upper Albian. *Lechites* Nowak (**66**. **a**, p. 350), which is closely related to *Hamites*, is derived by the decreasing costation and increased length of the shell. *Cyrtochilus* Meek (**63**, p. 392), which develops from *Lechites*, continues the decline of costation, most of the septate portion being smooth. It is most characteristic of the Lower Cenomanian though the Upper Albian *C. bourchardianus* (d'Orbigny) is an early member of the genus. Nowak (**66a**, p. 350), apparently overlooking Meek's generic name but recognising the relationship between the two genera, included *C. baculoides* (Mantell) in *Lechites*; but he gives erroneous data for the age of the species, and *Lechites gaudini*, which is narrowly restricted in the Upper Albian, is stated to range through the entire Cenomanian.

Genus HAMITES Parkinson.

HAMITES aff. MAXIMUS J. Sowerby.

(Pl. XXXIX., figs. 2 *a*, *b*.)

One specimen is known, represented by a body-chamber, with an injury on one side (not shown in the figure). The cross-section is circular. Costæ are discontinuous across the dorsum. The thin flange-like costæ remove it from *H. maximus* J. Sowerby (**92**, vol. i., pl. 62, fig. 1) and *H. attenuatus* d'Orbigny non Sowerby (**69**, pl. 131, fig. 9), though this difference may be due to the specimen being an internal mould. Similar flange-like costæ occur on the *H. rotundus* (non Sowerby) of d'Orbigny (**69**, pl. 132, fig. 1) and Pictet (**79**, p. 129, pl. 14, fig. 1), and on the American *H. æquicostatus* Gabb (**35**, vol. i., p. 74, pl. 13, fig. 20). It is larger than *H. intermedius* J. Sowerby (**92**, vol. i., pl. 62, fig. 2) and the costæ are wider apart than in *H. charpentieri* Pictet (**79**, p. 131, pl. 14, figs. 2-4). The group is particularly characteristic of the *cristatus* zone at Folkestone.

The septal suture has short prominently bifid wide-stemmed saddles and regularly trifid lateral lobes.

Locality.—Ward River (head of Warrego) (Q.M. Coll.).

HAMITES SP. NOV.

1909 *Crioceras sp.* Etheridge Jr. (**30**), pl. 42, fig. 1.

The specimen figured by Etheridge is a member of the *maximus* group of *Hamites* but distinct from all species described. Its huge size renders comparison difficult though some undescribed Folkestone forms approach it closely.

Locality.—Tambo (A.M. Coll.).

Genus **LABECERAS** nov.

Genotype: *Labeceras papulatum* sp. nov.

Diagnosis.—Small shells with ancyloceratid coiling; aperture with short lateral lappets but no rostrum, costæ simple; septal suture I.U.L.E., with broad saddles and relatively narrow lobes.

It is doubtful whether this genus is related to *Hamitidæ* or *Scaphitidæ*; and for the present it is left with the former family. The early whorls are crioceratid, but the body-chamber is developed on a hook-shaped termination. Five species are known: *L. laqueus* (Etheridge fil.), *L. bryani* sp. nov., *L. compressum* sp. nov., *L. papulatum* sp. nov., and *L.* (?) *trifidum* sp. nov. The first three show no signs of tuberculation, but on *L. papulatum* and *L* (?) *trifidum* tubercles are developed on the inner margin of the hook.

The genus has not been figured outside Australia at present.

LABECERAS BRYANI sp. nov.

(Pl. XXXIX., figs. 4 *a*, *b*.)

1909 *Crioceras taylori* (pars, non olim) Etheridge Jr. (**30**), pl. 49, figs. 3, 5, 6 only.

Sp. Chars.—Micromorph, coiling ancyloceratid, with the aperture pointing towards the shaft; non-tuberculate; costæ very broad and, on the body-chamber, fairly widely spaced; cross-section subcircular, slightly compressed; aperture with rather long lappets; septal suture with broad saddles and narrow lobes.

Remarks.—This species is somewhat variable, to judge from the specimens examined. It is here restricted to the broadly costate forms with subcircular whorl-section. Etheridge (**30**, pl. 49, fig. 4), however, included in the species one form belonging to *L. laqueus.* In the holotype (pl. vi., fig. 4) the lateral lappet is visible at the aperture. Further the crioceratid portion of the whorl gave place to the straight limb at the base of the specimen, for there is an impression of the dorsum of the coil around it. The maximum thickness of the whorl is at the dorsum.

There is an interesting, though unfortunate, homœomorphic resemblance between *L. bryani* and *Toxoceratoides taylori* (Etheridge fil.), and the two had been grouped in the one species by Etheridge. *L. bryani* is a species from the Tambo Series whereas *T. taylori* is from low in the Roma Series. Small isolated fragments of the two are bound to be confused; but on complete specimens the closeness of coiling of the early whorls is a good distinguishing feature, while it is probable that, when discovered, the aperture of *T. taylori* will, in accordance with the general features of *Toxoceratoides*, not be directed towards the shaft as in *Labeceras.*

The species is named in honour of Mr. W. H. Bryan.

Locality.—South Central Queensland (A.M. Coll.).

LABECERAS LAQUEUS (Etheridge fil.).

1892 *Hamites* (or *Hamulina*) *laqueus* Etheridge Jr. (**42**), p. 496, pl. 42, figs. 14, 15.

1909 *Crioceras taylori* (pars) Etheridge Jr. (**30**), pl. 49, fig. 4 only.

Sp. Chars.—Micromorph, coiling ancyloceratid with aperture facing towards the shaft; cross-section circular; non-tuberculate; costæ thin, numerous.

Remarks.—This species differs from *L. bryani*, to which it is closely related, in the costæ being finer and more numerous, and in the whorl-section being circular. Etheridge, in a subsequent work (**30**, p. 160) confused his earlier species and appears to have regarded as *L. laqueus* the tuberculate form here separated as a new species (*L. trifidum*). But the holotype (**42**, pl. 42, fig. 14) is non-tuberculate, and the species must be restricted to forms agreeing with this. Such a form was figured by Etheridge in 1909 (**30**, pl. 49, fig. 4) as *L. taylori*. Two species were figured by Etheridge in 1905 as *Anisoceras* (?) sp. (**28**, pl. 2, figs. 1-3); and these were later included in the synonymy of *L. laqueus* (**30**, p. 160). But two of the specimens are apparently *Hamites* while the third (fig. 3) may belong to *Labeceras* but is apparently not *L. laqueus*.

Localities.—Tower Hill (Q.M. Coll., holotype); South Central Queensland (A.M. Coll.).

LABECERAS COMPRESSUM sp. nov.

(Pl. XXXVI., fig. 5; pl. XXXIX., figs. 5 *a*, *b*.)

Sp. Chars.—Micromorph, coiling ancyloceratid with aperture facing towards the shaft, whorl-section compressed; non-tuberculate; costæ numerous, thin, slightly prorsiradiate; septal suture normal.

Remarks.—This species is notable for its very compressed section in which the height of the whorl is nearly twice the breadth. It is related to *L. laqueus* which it resembles in costation. On the holotype the lateral lappet at the aperture is well seen.

Locality.—Tower Hill, Muttaburra (Q.M. Coll.).

LABECERAS PAPULATUM sp. nov.

(Pl. XXXVI., fig. 4; pl. XXXIX., figs. 3 *a*, *b*.)

Sp. Chars.—Micromorph, coiling ancyloceratid with aperture facing towards the shaft; small dorso-lateral tubercles are developed on the body-chamber; costæ very thin, close together; whorl-section circular; septal suture with very broad paucidentate saddles and very narrow lobes.

Remarks.—This species is distinguished by (1) the papillate tubercles on the body-chamber, (2) the fineness of the ribs, and (3) the extreme narrowness of the septal lobes. It is perhaps related to *L. laqueus* to which, except for the development of tubercles, it is very similar.

Locality.—Longreach (B.M. Coll.).

LABECERAS TRIFIDUM sp. nov.

1892 *Crioceras sp.* Etheridge Jr. (**42**), p. 502, pl. 33, fig. 4.

1909 *Crioceras laqueus* (pars) Etheridge Jr. (**30**), pl. 49, figs. 7 and 9 (non fig. 8).

Sp. Chars.—Complete specimens unknown (? micromorph ancyloceratid); body-chamber with prominent dorso-lateral tubercles from which very fine but prominent ribs trifurcate. Whorl-section subcircular with rather flattened dorsum.

Remarks.—As holotype is taken a specimen (G.S.Q. Coll.) figured by Etheridge (**30**, pl. 49, fig. 9). The species in its tuberculation is closest to *L. papulatum* to which it is probably connected via such forms as a figured paratype (Etheridge, **30**, pl. 49, fig. 7). But it is distinguished from that species in the prominence of the tubercles, the thin flange-like ribs which trifurcate at the tubercles, and in its larger size. Three specimens have been figured, while a fourth has been examined by the writer. In all cases they consist of the initial part of the body-chamber and the suture line is thus unknown. But one of the specimens figured by Etheridge (**30**, pl. **49**, fig. 7) shows that the shell previous to the body-chamber was non-tuberculate.

Labeceras in mode of coiling is homœomorphous with *Leptoceras* and *Acrioceras*; and it is a point of interest that, in the last-named genus, similar dorso-lateral tubercles are developed on the body-chamber in such species as *A. tabarelli* (Astier) (**4**, p. 19, pl. 7, fig. 9).

Localities.—15 miles S.W. of Hughenden (G.S.Q. Coll., holotype); Landsborough Creek (G.S.Q. Coll.); South Central Queensland (A.M. Coll.).

Genus **APPURDICERAS** nov.[40]

Genotype *Ancyloceras cordycepoides* Etheridge fil.

Diagnosis.—Micromorph shells with ancyloceratid coiling; strongly costate and with prominent ventro-lateral tubercles; septal suture I.U.L.E.

This genus includes two Australian and a number of foreign species. In the English Gault it is represented by *A. spinigerum* (J. Sowerby). The Wiltshire collection in the Sedgwick Museum contains a large number of complete specimens of *A. spinigerum*; and from an examination of these it seems that the early whorls of a species, usually in one plane (criocératid), may often be slightly helicoid. *Hamites alternatus* Mantell may be a Lower Cenomanian member of the genus. At Folkestone the genus appears to be characteristic of the *auritus* zone (Spath, **99**, p. 76).

Appurdiceras is very similar to *Anisoceras* from which it differs in not having a medio-lateral row of tubercles; while the group of "*Hamites*" *elegans* d'Orbigny is another parallel development. *Anisoceras* is directly related to *Hamites* whereas there can be little doubt that *Appurdiceras* is derived from *Labeceras*; and the two genera therefore probably represent hamitid stocks independently developing tuberculation.

In the uppermost Aptian a group appears, typified by "*Ancyloceras patagonicum*" Stolley (**108**, p. 11, pl. 1, figs. 2, 3) which also has ventro-lateral tubercles only. This group extends into the Lower Albian at least to the *mamillatum* zone, but has no genetic relationship with *Appurdiceras*.

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[40] From *Appurda*, which (fide Etheridge) is the name given to these fossils by the natives of the Lake Eyre region (from the resemblance to "purda," worms).

APPURDICERAS CORDYCEPOIDES (Etheridge fil.).

1905 *Ancyloceras cordycepoides* Etheridge Jr. (**28**), p. 14, pl. 1, figs. 3-5; pl. 2, fig. 4.

Sp. Chars.—Micromorph, coiling ancyloceratid; costæ broad rounded close together, prorsiradiate, ventro-lateral tubercles strong, subcircular; whorl-section subrectangular (rhomboidal); costæ bundled in groups of 2 or 3.

Remarks.—If the three specimens figured by Etheridge are the same species then the tubercles appear to have been septate; for one shows long spines whereas two first specimens (casts) have truncate tubercles. There are some forms in the Wiltshire collection in the Sedgwick Museum from the Gault of Folkestone which are very similar to *A. cordycepoides.* Of the species figured by Sowerby perhaps *A. nodosus* (**92,** vol. iv., pl. 216, fig. 3) is the closest, but it differs in the inclination of the ribs.

Locality.—Dalhousie Springs (G.S.S.A. Coll.).

APPURDICERAS (?) ETHERIDGEI sp. nov.

(Pl. XXXVIII., figs. 2 *a*, *b*.)

Sp. Chars.—Micromorph, coiling ancyloceratid, with the aperture pointing towards the shaft; costæ prominent rounded; slightly compressed in cross-section; ventro-lateral tubercles appear on the shaft only; septal suture similar to that of *Labeceras bryani*.

Remarks.—This very interesting species agrees very well with *Labeceras* but for its tubercles. Coiling and septal sutures are identical with *L. bryani.* The early (crioceratid) whorls are not known; but tubercles are not present on the early part of the shaft. This suggests that the species is an early form of *Appurdiceras*, although it may represent another branch from *Labeceras* with similar ventro-lateral tubercles.

The species is named in honour of the late R. Etheridge Jr.

Locality.—Kensington, W. Queensland (N.M. Coll.).

Family ANISOCERATIDÆ Hyatt emend. Spath.

Genus ANISOCERAS Pictet.

ANISOCERAS SP. NOV.

1909 *Crioceras sp.* Etheridge Jr. (**30**), pl. 35, fig. 2; pl. 46, fig. 2; pl. 47, fig. 5.

Whether the two specimens figured by Etheridge represent different species cannot yet be decided, although the lateral row of tubercles has not quite the same position in the two forms. The larger develops peculiar flange-like costæ on the body-chamber on which the tubercles tend to decline.

Pictet (**76**, p. 705) established the genus *Anisoceras* with *Hamites saussureanus* Pictet (**79**, p. 118, pl. 13, figs. 1-4) as genotype. But the large composite "specimen" illustrated, composed of several separate fragments, may include two genera and it is advisable to select fig. 2*a* as genotype and holotype. The genus should be restricted to the bituberculate hamitids of the Upper Albian and Lower Cenomanian.

The present species is related to *A. saussureanum* (restricted) but differs slightly in ribbing and tuberculation.

A. perarmatum Pictet et Campiche (**78**, p. 65, pl. 49) is somewhat similar but the ribs are finer and more numerous. On the Cenomanian *A. armatus* (Mantell) (**62**, p. 121, pl. 23, figs. 3, 4) the lateral row of tubercles is nearer the venter and the ribbing is different.

Locality.—Ward River watershed (A.M. Coll.).

Family ALETECERATIDÆ nov.

The four Upper Albian genera *Aleteceras*, *Myloceras*, *Flindersites* nov. (v. inf.) and *Algerites* Pervinquière (all characterised by openly coiled shells, very lytoceratid, and possessing ventro-lateral tubercles) are included in this family. The group is evidently a direct offshoot from *Lytoceratidæ* via *Cicatrites* Anthula (**3**, p. 100, pl. 7, fig. 6) which is markedly similar to *Aleteceras*, differing merely in not having crioceratid whorls and the septate (?) nature of the tubercles. *Cicatrites*, at present, is only known in the Caucasus where it occurs in the *aschiltaensis* zone (the topmost zone of the Aptian). How high it extends is of course unknown; but being a lytoceratid its range may be considerable. The type of ribbing of the *Aleteceratidæ* is decidedly lytoceratid;[41] while the septal sutures, which are of the I.U.L.E. type, agree in every detail with the *Lytoceratidæ*, particularly *Cicatrites*.

Algerites, which differs from the other genera in the relative smoothness of its whorls, is the only member of the family unknown in Australia; but the other three genera have not yet been recorded beyond Australia.

Genus **ALETECERAS** nov.[42]

Genotype *Crioceras plectoides* (Etheridge fil.).

Diagnosis.—Coiling crioceratid; whorl-section subcircular to subquadrate; costæ thin, usually reclined; large ventro-lateral tubercles at which the ribs are bundled usually in groups of three; septal suture I.U.L.E. with strongly bifid saddles and regularly trifid lobes.

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[41] Compare e.g. *Aleteceras* and such ribbed lytoceratids as the Senonian *Gaudryceras cinctum* (Crick ms.) Spath (**98**, p. 118, pl. 9, fig. 3).

[42] ἀλέτης, a millstone.

Four species are known—*A. plectoides* (Etheridge fil.), *A. tardicostatum* sp. nov., *A. nautiloides* (Etheridge fil.) and *A.* (?) *axonoides* (Etheridge fil.). Both *A. plectoides* and *A. tardicostatum*, so far as is known, retain tubercles throughout life; but a change in type of tuberculation takes place in *A.* (?) *axonoides*, while in *A. nautiloides* a non-tuberculate stage succeeds the tuberculate. Although zonal collecting has not been made it is probable that the two latter species are later than the two former.

ALETECERAS PLECTOIDES (Etheridge fil.).

(Pl. XL., figs. 2 *a*, *b*, *c*.)

1909 *Crioceras plectoides* Etheridge Jr. (30), p. 152, pl. 33, fig. 2; pl. 46, fig. 1; pl. 47, figs. 1-4.

Sp. Chars.—Coiling crioceratid; whorl-section equidimensional, subquadrate; venter arched; costæ slightly reclined; ventro-lateral tubercle hemispherical, at which the ribs trifurcate; septal suture with saddles and lobes of equal size, moderately narrow-stemmed.

Lectotype.—Etheridge (**30**), pl. 46, fig. 1 (A.M. Coll.).

Dimensions —

Holotype : ϕ 160. 37. —. 38.
(**30**), pl. 47, fig. 1 : ϕ 86. 40. 48. 36.
Pl. xl., fig. 2 : 78. 42. 42. 35.

Remarks.—The first whorl, as in all members of the family as far as is known, is openly coiled (gyral). The tuberculate ribs in the younger whorl are more prominent than the non-tuberculate, varying numbers of which (from 3 to 10) are interposed between each pair of tuberculate ribs. The latter have a tendency to bifurcate near the umbilical margin, the two branches being united finally by the tubercle from which three ribs proceed across the venter. In later whorls the tubercle is often spread over three ribs, which do not subdivide further on passing the tubercle.

Localities.—Central or South-west Queensland (A.M. Coll., holotype); South Central Queensland (A.M. Coll.); Wellshot (G.S.Q. Coll.); Walsh River (Q.M. Coll.).

ALETECERAS TARDICOSTATUM sp. nov.

(Pl. XL., figs. 1 *a*, *b*, *c*.)

Sp. Chars.—Coiling crioceratid; costæ very numerous, close together, strongly reclined; tubercles subcircular, massive; in earlier whorls tubercles on about every fourth rib which trifurcates at the tubercle; in later whorls the tubercle spreads over three ribs and between are about eight non-tuberculate, simple ribs; whorl-section subrectangular; septal suture narrowly divided.

Dimensions.—Holotype (A.M. Coll.): θ 51. 90.

Remarks.—This species differs from *A. plectoides* in several respects—ribs are more numerous, closer together, and more reclined; whorl-section is slightly more compressed; tubercles are more prominent, and on later whorls tuberculation is different; and the branches of ES are more indented. Only the one specimen has been seen.

The tuberculation of the inner whorls is precisely similar to that of *A. plectoides*, but the tubercles are more massive while on later whorls the position of the tubercles joining three otherwise unaffected ribs is apparently constant (in *A. plectoides* this type is not constant on any individual.)

Locality.—South-Central Queensland (A.M. Coll., holotype).

ALETECERAS NAUTILOIDES (Etheridge fil.).

1909 *Crioceras nautiloides* Etheridge Jr. (**30**), p. 148, pl. 45 and text figure 8.

Sp. Chars.—Coiling crioceratid; whorl-section depressed; sides convergent, venter evenly arched; early whorls with tuberculation of the *plectoides* type, later whorls non-tuberculate; costæ straight, reclined; septal suture with broad saddles and narrow lobes.

Remarks.—The species has been described in detail by Etheridge. The massive depressed whorls distinguish it from the other species. The tuberculation of the inner whorls is of the same massive type as that seen in the inner whorls of *A. tardicostatum*. Later whorls, while having costation essentially similar to the latter species, have lost all tubercles. The septal suture is not so indented as that of *A. tardicostatum*, being rather more like that of *A. plectoides*.

On account of the tubercles ceasing at a relatively early age Etheridge (**30**, p. 150) called attention to the similarity to "*Crioceras jackii.*" Such similarity is, of course, purely morphic and there is no connection between the present species and *Australiceras*.

Locality.—Aramac (G.S.Q. Coll., holotype).

ALETECERAS (?) AXONOIDES (Etheridge fil.).

1909 *Crioceras axonoides* Etheridge Jr. (**30**), p. 150, pl. 32, fig. 4; pl. 44, fig. 1.

This species has been well described by Etheridge. It differs markedly from the other three in its wider umbilicus, the situation of the tubercles nearer to the central line of the venter, and by the ribs being almost directly radial. Eventually it may be necessary to remove it from *Aleteceras*. Tuberculation in early whorls is of the *Aleteceras* type; but on later whorls it is of the type seen in *Myloceras*. The flatness of the venter and the position of the tubercles are also more suggestive of *Myloceras* though the whorl-section is that of *Aleteceras*. The species may be an offshoot from *Aleteceras* developing somewhat parallel to *Myloceras*.

Locality.—" Queensland " (M.M. Coll., holotype).

Genus **MYLOCERAS** nov.[43]

Genotype *Crioceras ammonoides* (Etheridge fil.).

Diagnosis.—Coiling crioceratid; whorl-section compressed, rectangular; costæ thin, slightly curved, with small, simple tubercles on the ventro-lateral angles; septal suture I.U.L.E. with deeply bifid saddles and regularly trifid lobes.

Three species are known: *M. ammonoides* (Etheridge fil.), *M. orbiculus* sp. nov., and *M. davidi* sp. nov. The genus is remarkably similar to *Algerites* Pervinquière (**74**, p. 46), differing mainly in costation. From *Aleteceras* it differs in being more compressed and in having finer and more numerous tubercles at which the ribs are not associated in groups of three. The tubercles are mainly papillate and generally cover one rib only, though in some cases the ribs may be associated in pairs at the tubercles.

MYLOCERAS AMMONOIDES (Etheridge fil.).

(Pl. XLI., figs. 2 *a*, *b*.)

? 1892 *Crioceras edkinsi* Etheridge Jr. (**42**), p. 502, pl. 30, figs. 8, 9.
1909 *Crioceras ammonoides* Etheridge Jr. (**30**), p. 151, pl. 49, figs. 1, 2.
? 1909 *Leptoceras* (?) *edkinsi* Etheridge Jr. (**30**), p. 165.

Sp. Chars.—Coiling crioceratid; whorl-section very compressed, rectangular; venter flattened, sides subparallel; costæ very slightly flexed on sides, straight on venter, bearing small rather elongate tubercles on intermittent ribs; tubercles occasionally bundling ribs in pairs; costæ not bifurcating at the tubercles; septal suture not known.

Dimensions.— Holotype (G.S.Q. Coll.): ϕ 62. 39. 24. 40.

Remarks.—In the bundling of ribs in pairs at the tubercles the species is probably nearer to *Aleteceras* than any other member of the genus. This relationship is stressed by the size of the tubercles, which, though distinctly smaller than in *Aleteceras*, are somewhat larger than in any other species of *Myloceras*. In its compressed whorls the species is markedly distinct from the former genus and is the most compressed species in *Myloceras*.

The writer has examined the inner whorls of the specimen now figured. They are remarkably similar to "*Crioceras*" *edkinsi* but there is primitive bifurcation of the ribs at the tubercles, a feature not mentioned by Etheridge on "*Crioceras*" *edkinsi*. It appears, therefore, that *M. edkinsi* and *M. ammonoides* may be identical. Until that can be tested definitely the name *ammonoides* is retained. The genus has nothing to do with *Leptoceras*, to which Etheridge provisionally referred *M. edkinsi*; and the resemblance does not even extend to mode of coiling, for *Leptoceras* is an ancyloceratid micromorph.

Locality.—Port Douglas (G.S.Q. Coll., holotype); Dalhousie Springs (A.M. Coll.).

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[43] μύλος, a millstone.

MYLOCERAS ORBICULUS sp. nov.

(Pl. XLI., figs. 1 *a*, *b*.)

Sp. Chars.—Coiling crioceratid; whorl-section compressed, with slightly convergent sides and very slightly arched venter; costæ thin, very numerous, slightly flexed on the sides, straight on the venter; tubercles very small, pappillate, on occasional ribs which do not bifurcate at the tubercle; costæ on the body-chamber non-tuberculate; septal suture with relatively broad, rectangular, bifid saddles and narrow regularly trifid lobes.

Dimensions.—Holotype (A.M. Coll.): 122 (95). 48. 34. 31.

Remarks.—One specimen only is known definitely. This is the most massive-whorled species of the genus and differs from the other forms, not only in width of whorl, but in the faintness of the pappillate tubercles. These are to be seen only up to the penultimate chamber, the body-chamber being non-tuberculate. The septal suture agrees well with that of *M. ammonoides* and it is probable that *M. orbiculus* is derived from *M. ammonoides* which it resembles in many ways.

The slightly greater curvature of the ribs at the end of the holotype suggests that the specimen is almost complete to the aperture and that the body-chamber was about half a whorl in length and had short lateral lappets.

Locality.—Beaconsfield (A.M. Coll.); West side of Ward River, 23 miles S.W. of Tambo (F.W.W. Coll.).

MYLOCERAS DAVIDI sp. nov.

(Pl. XXXVII., figs. 2 *a*, *b*, *c*.)

1909 *Crioceras sp.* Etheridge Jr. **(30)**, p. 144, pl. 38, figs. 1, 2.

Sp. Chars.—Coiling crioceratid, whorls compressed; first whorls more loosely coiled than later; costæ thin, numerous, with small pappillate ventrolateral tubercles; septal suture with rectangular saddles and deep very narrow L_1.

Remarks.—This species is closely related to *M. orbiculus*. In ribbing and tuberculation it is markedly similar to that species but differs in being more compressed and in the deep narrow lateral lobe of the septal suture. The septal suture of the first whorl, however, is very similar to that of *M. orbiculus*. The costæ on the specimen figured by Etheridge are straight; while on the holotype they are slightly flexed. This may not be a specific difference; and the curvature on the holotype is exaggerated by medio-lateral crushing.

Localities.—Bowen Downs, Thomson River (Q.M. Coll., holotype); Barcoo, Ward, and Nive Rivers area (A.M. Coll.).

Genus **FLINDERSITES** nov.[44]

Genotype *F. baccatus* sp. nov.

Diagnosis.—Coiling ancyloceratid; whorl-section subcircular to subrectangular, compressed; costæ straight or slightly flexed with ventro-lateral tubercles; apertures with short lateral lappets; septal suture I.U.L.E.

The genus is proposed for group of forms with ancyloceratid coiling. It is derived apparently from *Aleteceras* but develops differently in that, in later (?) forms, the ventro-lateral tubercle becomes thin and elongated as in *F. flindersi* (McCoy). The variety of forms present is amazing, and the number of specimens seen by the writer is entirely insufficient to determine the specific limits among the host of forms that have been figured by Etheridge (**42**, **28**, and **30**). Those figures do not include all forms, for specimens seen by the writer belong to groups not depicted by Etheridge. The difficulty of making divisions within this assemblage was realised by Etheridge (**30**, p. 153), who grouped them all as *Crioceras flindersi* though pointing to several distinct types in the series.

The series requires separation; but all that is advisable to do here is to define several of the more distinct species, leaving a complete analysis for a further occasion when more specimens of the other forms are available.

FLINDERSITES BACCATUS sp. nov.

1909 *Crioceras flindersi* (pars) Etheridge Jr. (**30**), pl. 36, fig. 2; pl. 41, fig. 3; pl. 42, fig. 2; pl. 44, fig. 2.

Sp. Chars.—Coiling ancyloceratid; ventro-lateral tubercles hemispherical; costæ thin, sharply defined, in groups of two at the tubercle; whorl-section slightly compressed, subquadrate.

Remarks.—As holotype is taken a specimen figured by Etheridge (**30**, pl. 36, fig. 2; pl. 42, fig. 2; pl. 44, fig. 2). The early whorls are unknown. In its hemispherical tubercles this species is probably closer to *Aleteceras* than any other in the genus.

Localities.—Wellshot (G.S.Q. Coll., holotype); South Central Queensland (A.M. Coll.); west bank of Ward River, 23 miles S.W. of Tambo (F.W.W. Coll.).

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[44] Named from its abundance in the Flinders River section. Since this paper was written Dr. Spath has shown the writer a species of *Myloceras* from Portuguese East Africa which has ancyloceratid coiling. Mode of coiling is therefore of questionable importance as a generic feature, and the name *Flindersites* may have to be abandoned. Differences in ribbing may, however, require it to be separated from *Aleteceras*; for the group seems natural from the point of view of ornamentation.

FLINDERSITES FLINDERSI (McCoy).

1867 *Ancyloceras flindersi* McCoy (**60**), p. 356.
1909 *Crioceras flindersi* (pars) Etheridge Jr. (**30**), pl. 39, fig. 1.

This holotype of this species was not figured by McCoy but has been figured by Etheridge. The ventral and apertural views, however, were not given. It is a gigantic species but still *very* imperfectly unknown.

Locality.—Head of Flinders River (N.M. Coll., holotype).

FLINDERSITES aff. FLINDERSI (McCoy).

1909 *Crioceras flindersi* (pars) Etheridge Jr. (**30**), pl. 39, figs. 2, 3.

This is a common type; but it is only known from fragments. Its relationship to *F. flindersi* cannot be determined until better specimens have been found. It has the same elongated tubercles and the same type of ribbing as *F. flindersi.*

Locality.—Flinders River (Q.M. Coll.).

FLINDERSITES aff. BACCATUS sp. nov.

1909 *Crioceras flindersi* (pars) Etheridge Jr. (**30**), pl. 40, fig. 4.

This form has similar tuberculation to *F. baccatus* but is rather wider and the costæ are bundled in groups of 3 or 4 at the tubercles.

Locality.—Saltern Creek (Q.M. Coll.).

FLINDERSITES INTERMEDIUS sp. nov.

1909 *Crioceras flindersi* (pars) Etheridge Jr. (**30**), pl. 40, figs. 1, 2.

Sp. Chars.—Coiling ancyloceratid; whorl-section subquadrate, equidimensional; venter very broad; costæ thin, flexed, prominently rursiradiate on approaching the ventro-lateral tubercles; tubercles blunt, elongate.

Remarks.—This species is peculiar in the course of the costæ The tubercle is elongated as in *F. flindersi* but is intermediate in character between that of *F. baccatus* and *F. flindersi*. Certain other forms figured by Etheridge are closely connected (**30**, pl. 40, figs. 5, 6; pl. 51, fig. 1).

Localities.—Mount Cornish (Q.M. Coll., holotype); Longreach (Q.M. Coll.).

FLINDERSITES SP. NOV.

1905 *Crioceras flindersi* (pars) Etheridge Jr. (**30**, pl. 1, fig. 1; pl. 3, fig. 1).

This type with papillate tubercles is common but the writer has only seen fragments.

Localities.—Dalhousie Springs (G.S.S.A. Coll.); Beaconsfield (A.M. Coll.).

WORKS CITED IN THE TEXT.

1. Adkins W. S., 1918. The Weno and Papaw formations of the Texas Comanchean (Univ. Texas. Bull. No. 1856).
2. Anderson F. M., 1902. The Cretaceous deposits of the Pacific Coast (Proc. Californian Acad. Sci., ser. 3, Geol., vol. ii., No. 1).
3. Anthula D. J., 1900. Über die Kreidefossilien des Kaukasus (Beit. z. Pal. u. Geol. Öst-Ung. u.d. Orients, Bd. xii.).
4. Astier J. E., 1851. Catalogue descriptif des *Ancyloceras* (Lyon).
5. Bayle E., 1878. Explication de la carte géologique de la France (Paris).
6. Bonarelli y Nagera, 1921. Observaciones geologicas en las immediaciones del Lago San Martin (Min. de Agric. Buenos Aires, Bol. 27, ser. B, Geol.).
7. Bose E., 1910. Monografia geológica y paleontólogica del Cerro de Muleros (Bol. Inst. Geol. Mexico No. 25).
8. Böse E., 1923. Algunas faunas Cretacicas de Zacatecas (Ibid. No. 42).
9. Boule M., 1895. Sur les fossiles rapportés de Madagaskar par M. Gauthier (Bull. Mus. Hist. Nat. Paris I.).
10. Boule, Lemoine et Thévenin, 1907. Cephalopodes de Diego-Suarez (Ann. de Paléont., t. ii.).
11. Buckman S. S., 1909—. Yorkshire type Ammonites (Continued as "Type Ammonites"). vols. i.-v. (London).
12. Choffat et de Loriol, 1888. Matériaux pour l'étude stratigraphique et paléontologique de la province d'Angola (Mem. Soc. Phys. et Hist. Nat. Genève, t. 30).
13. Conrad T. A., 1860. Descriptions of new species of Cretaceous and Eocene fossils of Mississippi and Alabama (Journ. Ac. Nat. Sci. Philadelphia, ser. 2, vol. iv.).
14. Coquand H., 1865. Monographie de l'étage Aptien de l'Espagne (Marseille).
15. Coquand H., 1891. (In Sayn: "Description des ammonites Barrémien Djebel Ouach, Constantine") (Bull. Soc. Agric. Lyon, ser. 6, vol. iii.)
16. Crick G. C., 1907. Cephalopoda from Zululand (Pt. iii. of 3rd Rep. Geol. Surv. Natal and Zululand).
17. Crick G. C., 1916. On *Ammonitoceras tovilense* from the Lower Greensand of Kent (Proc. Malac. Soc., vol. xii.).
18. Cuvier et Brongniart, 1822. Description géologique des environs de Paris (Paris).
19. Danford C. G., 1906. Notes on the Speeton ammonites (Proc. Yorks. Geol. Soc., n.s., vol. xvi., pt. i.).
20. Diener C., 1915. Bemerkungen zur Nomenklatur der Gattung *Scaphites* (Centralb. f. Min., etc., Bd. xvii.).
21. Dumas E., 1875-6. Statistique géologique, minéralogique, metallurgique et paléontologique du département du Gard (Paris).
22. Etheridge R., 1872. Description of the palæozoic and mesozoic fossils of Queensland (Q.J.G.S., vol. xxviii.).
23. Etheridge R. Jr., 1880. On a collection of fossils from the Bowen River Coalfield (Proc. Roy. Phys. Soc. Edinburgh, vol. v.).
24. Etheridge R. Jr., 1901. Additional notes on the palæontology of Queensland, pt. 2. (Geol. Surv. Q'land. Bull. No. 13).
25. Etheridge R. Jr., 1902. The Cretaceous mollusca of South Australia (Mem. Roy. Soc. South Aust., vol. ii., pt. i.).

26. Etheridge R. Jr., 1902. A monograph of the Cretaceous invertebrate fauna of New South Wales (Mem. Geol. Surv. N.S. Wales, Pal., No. 11).

27. Etheridge R Jr., 1904. On the occurrence of the genus *Ptychoceras* (?) and other additional fossils in the Cretaceous beds of the Northern Territory (Recs. Aust. Mus., vol. v., pt. 2).

28. Etheridge R. Jr., 1905. Cretaceous fossils from Dalhousie Springs (Parl. Paper South Aust., No. 71).

29. Etheridge R. Jr., 1907. (*a*) The Cretaceous fossils of Point Charles; (*b*) The Cretaceous fossils of Shoal Bay: (*c*) The Cretaceous fossils of Maclear Creek (Ibid. No, 54, 1907—Suppl. to No. 55, 1906).

30. Etheridge R. Jr., 1909. Lower Cretaceous fossils from the sources of the Barcoo, Ward and Nive Rivers (Recs. Aust. Mus., vol. vii., Nos. 3, 4).

31. Etheridge R. Jr., 1913. The Cretaceous Fossils of the Gingin "Chalk." (Geol. Surv. West. Aust. Bull. No. 55).

32. Fallot P., 1910. Sur quelques fossiles pyriteux du Gault des Baléares (Ann. de Univ. Grenoble, t. xxii., No. 3).

33. Favre F., 1908. Die Ammoniten der unteren Kreide Patagoniens (Neu. Jahrb.' f. Min. etc., B. Bd. xxv.).

34. Frech F., 1915. Über *Scaphites* (Centralb. f. Min., etc., Bd. xvi.

35 Gabb W. M., 1864, 1869. Cretaceous fossils (Geol Surv. California Pal., vols. i. and ii.).

36. Gregory and Smith, 1903. A new ammonite from the Cretaceous rocks of Queensland. (Proc. Roy. Soc. Victoria, vol. xv., n.s., pt. ii.).

37. Grossouvre A. de, 1894. Les ammonites de la Craie supérieure. (Mém. Carte Géol. France II. Pal.).

38. Haug E., 1907. Traité de Géologie, tome ii. (Paris).

39. Hudleston W. H., 1890. Further notes on some mollusca from South Australia (Geol. Mag., n.s., dec. iii., vol. vii.).

40. Hyatt A., 1900. Cephalopoda (in Zittel-Eastman, "Textbook of Palæontology," vol. i., first ed.) (London).

41. Hyatt A., 1903. Pseudoceratites of the Cretaceous (Mon. U.S. Geol. Surv., No. 44).

42. Jack and Etheridge, 1892. The geology and palæontology of Queensland and New Guinea (Brisbane).

43. Jacob C., 1907. Études sur la partie moyenne des terrains Crétacés (Ann. de l'Univ. Grenoble, vol. xix.).

44. Jacob C., 1908. Étude sur quelques ammonites du Crétacé moyen (Mem. Soc. Geol. France, Pal., No. 38).

45. Jacob et Tobler, 1906. Étude stratigraphique et paléontologique du Gault de la vallée de la Engelberger Aa. (Mem. Soc. Pal. Suisse, vol. xxxiii.).

46. Jukes-Browne A. J., 1875. On the relations of the Cambridge Gault and Greensand (Q.J.G.S. vol. xxxi.).

47. Keeping W., 1883. The fossils and palæontological affinities of the Neocomian deposits of Upware and Brickhill (Cambridge).

48. Kilian W., 1907-13. Unterkreide (in F. Frech: "Lethæa Geognostica" ii. Theil, 3 Bd., 1 Abt.) Stuttgart.

49. Kilian W., 1910. Sur le genre *Ammonitoceras* (Bull. Geol. Soc. France, ser. iv., vol. x.).

50. **Kilian et Piroutet, 1905.** Sur les fossiles eocrétaciques de la Nouvelle-Caledonie (Bull. Soc. Geol. France, ser. 4, No. 5).

51. **Koenen A. v., 1902.** Die Ammonitiden des Norddeutschen Neocom (Abh. d.k. preuss. Geol. Landes., N.F., H. 24).

52. **Kossmat F., 1895-7.** Untersuchungen über die südindische Kreideformation (Beit. z. Pal. u. Geol. Öst.-Ung. u.d. Orients. (*a*) Pt. 1, vol. ix.; (*b*) Pt. 2, vol. x.; (*c*) Pt. 3, vol. xi.

53. **Krause P. G., 1902.** Die Fauna der Kreide von Temojoh in West Borneo (Samml. d. geol. Reichsmus. in Leiden, ser. i., Bd. vii., H.i.).

54. **Krenkel E., 1910.** Die Aptfossilien der Delagoa-Bai (Neu. Jahrb. f. Min. etc., Bd. i.).

55. **Lemoine P., 1906.** Études géologiques dans le nord de Madagascar (Contrib. à l'Hist. Geol. de l'Ocean Indien) (Paris).

56. **Leymerie A., 1842.** Sur le terrain Crétacé du departement de l'Aube (Mém. Soc. Géol. France, ser. i., t. 5).

57. **Loriol P. de, 1861.** Description des animaux invertébrés fossiles du Mont Salève (Genève et Bâle).

58. **McCoy F., 1865.** On the discovery of Cretaceous fossils in Australia (Trans. Roy. Soc. Victoria, vol. vii.).

59. **McCoy F., 1865.** Notes on the Cretaceous deposits of Australia (Ann. Mag. Nat. Hist., ser. 3, vol. xvi.).

60. **McCoy F., 1867.** On the discovery of *Ichthyosaurus* and *Plesiosaurus* in Australia (Ann. Mag. Nat. Hist., ser. 3, vol. xix.).

61. **McCoy F., 1868.** On the discovery of *Enaliosaurus* and other Cretaceous fossils in Australia (Trans. Roy. Soc. Victoria, vol. viii.).

62. **Mantell G., 1822.** The fossils of the South Downs (London).

63. **Meek and Hayden, 1876.** Report on the invertebrate Cretaceous and Tertiary fossils of the Upper Missouri Country (Rep. U.S. Geol. Surv. of the Terr., vol. ix.).

64. **Moore C., 1870.** Australian Mesozoic geology and palæontology (Q.J.G.S., vol. xxvi.).

65. **Neumayr und Uhlig, 1881.** Ueber Ammonitiden aus dem Hilsbildungen Norddeutschlands (Palæontographica, Bd. 27).

66. **Nowak J., 1908-13.** Untersuchungen uber Cephalopoden der oberen Kreide in Polen (*a*) I., 1908; (*b*) II., 1911; (*c*) III., 1913. (Bull. de l'acad. Sci. Cracovie, Cl. Math. et Nat.).

67. **Nowak J., 1916.** Zur Bedeutung von *Scaphites* fur die Gliederung der Oberkreide (Vehr. d.k.k. geol. Reichs., No. 3).

68. **Ooster W. A., 1857-63.** Pétrifactions remarquables des Alpes Suisses. Catologue des Céphalopodes fossiles (Genève).

69. **Orbigny A. d', 1840-1.** Paléontologie française terrains Crétacés. I. Cephalopodes (Paris).

70. **Parkinson J., 1833.** Organic remains of a former world, vol. iii, (London), (first edition was in 1811).

71. **Parona e Bonarelli, 1897.** Fossili Albiani d'Escragnolles del Nizzardo e della Liguria occidentale. (Pal. Italica, vol. ii.).

72. **Pavlow et Lamplugh, 1892.** Argiles de Speeton et leurs équivalents (Moscou).

73. **Pervinquière L., 1907.** Études de paléontologie Tunisienne. I. Cephalopodes des terrains secondaires (Carte Géol. de la Tunisie).

74. Pervinquière L., 1910. Sur quelques ammonites du Crétacé Algerien (Mem. Soc. Géol. France, Pal., No. 42).

75. Phillips J., 1829. Illustrations of the geology of Yorkshire (York).

76. Pictet F. J., 1854. Traité de paléontologie, t. ii. (Paris).

77. Pictet F. J., 1863-4. Mélanges paléontologiques, t. i. (Bâle et Genève).

78. Pictet et Campiche, 1858-64. Description des fossils du terrains Crétacé des environs de St. Croix, pts. i. et ii. (Genève).

79. Pictet et Roux, 1846. Description des mollusques fossiles des environs de Genève (Mem. Soc. Phys. et d'Hist. Nat. Genève, t. ii.).

80. Quenstedt F. A., 1846-9. Petrefactenkunde Deutschlands, Bd. I. Cephalopoden (Tübingen).

81. Ratte F., 1886. Note on *Crioceras australe* Moore ?, a lower Cretaceous fossil from Queensland. (Proc. Linn. Soc. N.S. Wales, ser. 2, vol. i.).

82. Richards H. C., 1913. The Cretaceous rocks of Woody Island, Queensland. (Rep. Aust. Ass. Adv. Sci., vol. xiv.).

83. Salfeld H., 1924. Die Bedeutung der Konservativstämme für die Stammesentwicklung der Ammonoideen (Leipzig).

84. Sarasin C., 1893. Étude sur les *Oppelia* du group du *nisus*. (Bull. Soc. Geol. France, ser. 3, t. xxi.).

85. Sarasin et Schöndelmayer, 1901. Étude monographique des ammonites du Crétacé inférieur de Châtel-St.-Denis, II. (Abh. d. Schweiz pal. Gesell., Bd. 29).

86. Scott G., 1924. Some gerontic ammonites of the Duck Creek Formation (Texas Christ. Univ. Quart., vol. i., No. 1).

87. Seeley H., 1865. On ammonites from the Cambridge Greensand (Ann. Mag. Nat. Hist., ser. 3, vol. xvi.).

88. Seunes J., 1887. Note sur quelques ammonites du Gault (Bull. Soc. Géol. France, ser. 3, t. xv.).

89. Sharpe D., 1853. Description of the fossil remains of mollusca found in the Chalk of England I. Cephalopoda (Pal. Soc. London).

90. Sinzow J., 1870. Apercu geologique du gouv. de Saratow (Bull. Soc. Min. St. Petersb., 2 ser., vol. 5).

91. Sinzow J., 1905. Über einige evoluten Ammonitiden aus dem oberen Neokom Russlands (Mat. Geol. Russl., Bd. xxii.).

92. Sowerby J. (continued by J. de C. Sowerby), 1812-29. The Mineral Conchology of Great Britain, vols. i.-vi. (London).

93. Sowerby J. de C., 1827. Appendix A to Fitton: "On the strata below the Chalk" (Trans. Geol. Soc., ser. 2, vol. iv.).

94. Sowerby J. de C., 1837. On the genus *Crioceratites* and on *Scaphites gigas*. (Trans. Geol. Soc. Ser. 2, vol. v.).

95. Spath L. F., 1919. Notes on Ammonites (Geol. Mag., vol. lvi.).

96. Spath L. F., 1921. On Cretaceous cephalopoda from Zululand (Ann. South African Mus., vol. xii., pt. vii., No. 16).

97. Spath L. F., 1922. On Cretaceous ammonoidea from Angola (Trans. Roy. Soc. Edinburgh, vol. liii., pt. i., No. 6).

98. Spath L. F., 1922. On the Senonian ammonite fauna of Pondoland (Trans. Roy. Soc. South Africa, vol. x., pt. iii.).

99. Spath L. F., 1923. Excursion to Folkestone with notes on the zones of the Gault (Proc. Geol. Ass., vol. xxxiv.).

100. Spath L. F., 1923. On the ammonite horizons of the Gault and contiguous deposits (App. II. to Summ. of Progress, Geol. Surv. Great Brit. for 1922).

101. Spath L. F., 1923. A monograph of the ammonoidea of the Gault, pt. i. (Pal. Soc. London).

102. Spath L. F., 1924. On the Blake collection of ammonites from Kachh, India (Pal. Indica, n.s., vol. ix., Mem. No. 1).

103. Spath L. F., 1924. On the ammonites of the Speeton Clay (Geol. Mag., vol. lxi.).

104. Stoliczka F., 1861. The fossil cephalopoda of the Cretaceous rocks of Southern India (Pal. Indica, vol. i.).

105. Stolley E., 1907. Ueber ein norddeutsches Aequivalent der Clansayes-Fauna Sudfranckreichs und der Schweiz (Centralb. f. Min., etc., Bd. viii.).

106. Stolley E., 1908. Die Gliederung der norddeutschen unteren Kreide (Centralb. f. Min., etc., Bd. ix.).

107. Stolley E., 1911. Über die Kreideformation und ihre Fossilien aus Spitzbergen (Kungl. Sven. Vet.-Akad. Handl., Bd. 47, No. 11).

108. Stolley E., 1912. Ueber einige Cephalopoden aus der unteren Kreide Patagoniens (Arkiv. f. Zool. k. Sven. Vet. Stockholm, Bd. vii., 23).

109. Tenison-Woods J. E., 1883. On some mesozoic fossils from the Palmer River, Queensland. (Jour. and Proc. Roy. Soc. N. S. Wales, vol. xvi.).

110. Tietze, E., 1872. Geologische und paläontologische Mittheilungen aus dem sudlichen Theil des Banater Gebirgsstockes (Jahrb. d. k. k. geol. Reichs. Wien, Bd. xxii.).

111. Waagen W., 1873-6. The Jurassic fauna of Kutch. I. Cephalopoda (Pal. Indica, ser. ix., vol. i.).

112. White C. A., 1887. Contribucoes a paleontologia do Brazil (Arch. do Museu Nac. do Rio de Janeiro, vol. 7).

113. Whiteaves J. F., 1876-1903. Mesozoic Fossils, vol. i. (Canadian Geol. Surv.).

114. Whitfield, R. P., 1891. Gastropoda and Cephalopoda of the Raritan Clays and Greensand Marls of New Jersey (U.S. Geol. Surv., Mon. No. 18).

115. Woods H., 1896. The Mollusca of the Chalk Rock, pt. i. (Q.J.G.S., vol. lii.).

116. Zittel K. A. v., 1881-5. Handbuch der Palaeontologie.

117. Zwierzycki J., 1914. Die Cephalopoden der Tendaguru-Schichten in Deutsch-Ostafrika (Arch. f. Biol., Bd. iii., Th. 4).

Plate XXXIV.

(All figures natural size unless otherwise stated.)

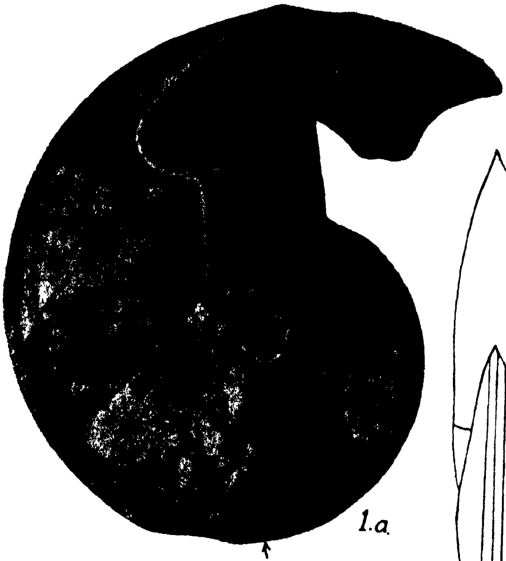
1. *Aconeceras walshense* (Etheridge fil.). (*a*) Lateral, (*b*) apertural view of topotype. The arrow indicates the beginning of the body-chamber. (See Pl. XXXVII., fig. 3). Walsh River (Q.M. Coll.); Roma Series (Lower Gargasian).

2. *Australiceras jacki* (Etheridge fil.). Topotype. Walsh River (Q.M. Coll.); Roma Series (Upper Bedoulian).

3. *Australiceras transiente* sp. nov. Holotype; (*a*) lateral view, (*b*) whorl-section taken at ×. Walsh River (Q.M. Coll.); Roma Series (Upper Bedoulian).

4. *Australiceras gracile* (Sinzow). Small fragment with whorl-section perfectly circular. Walsh River (Q.M. Coll.); Roma Series (Upper Bedoulian).

5. *Toxoceratoides taylori* (Etheridge fil.). Lateral view of fragment. Walsh River (Q.M. Coll.); Roma Series (Upper Bedoulian).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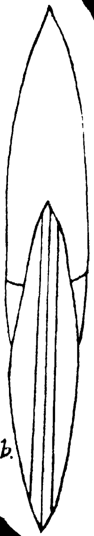
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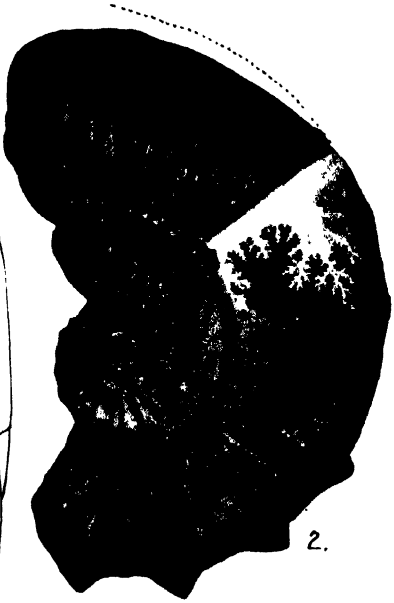
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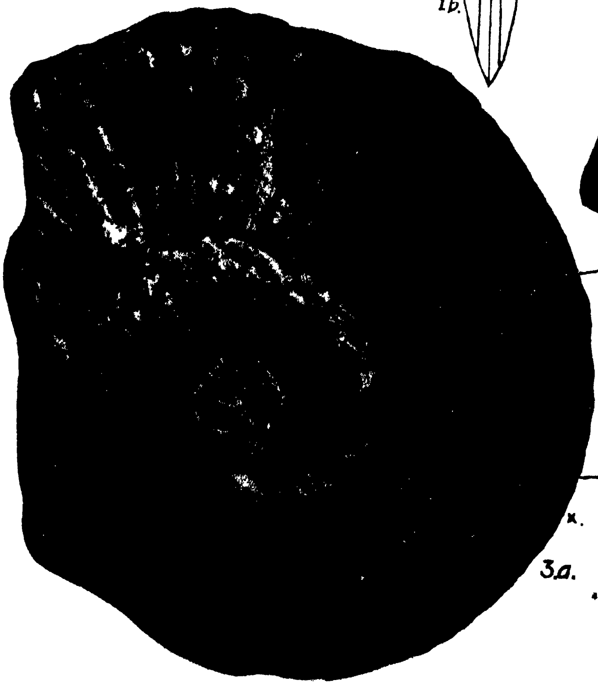

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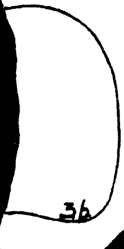
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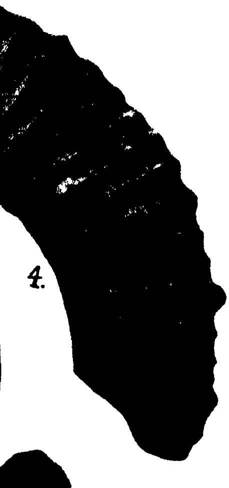

4.

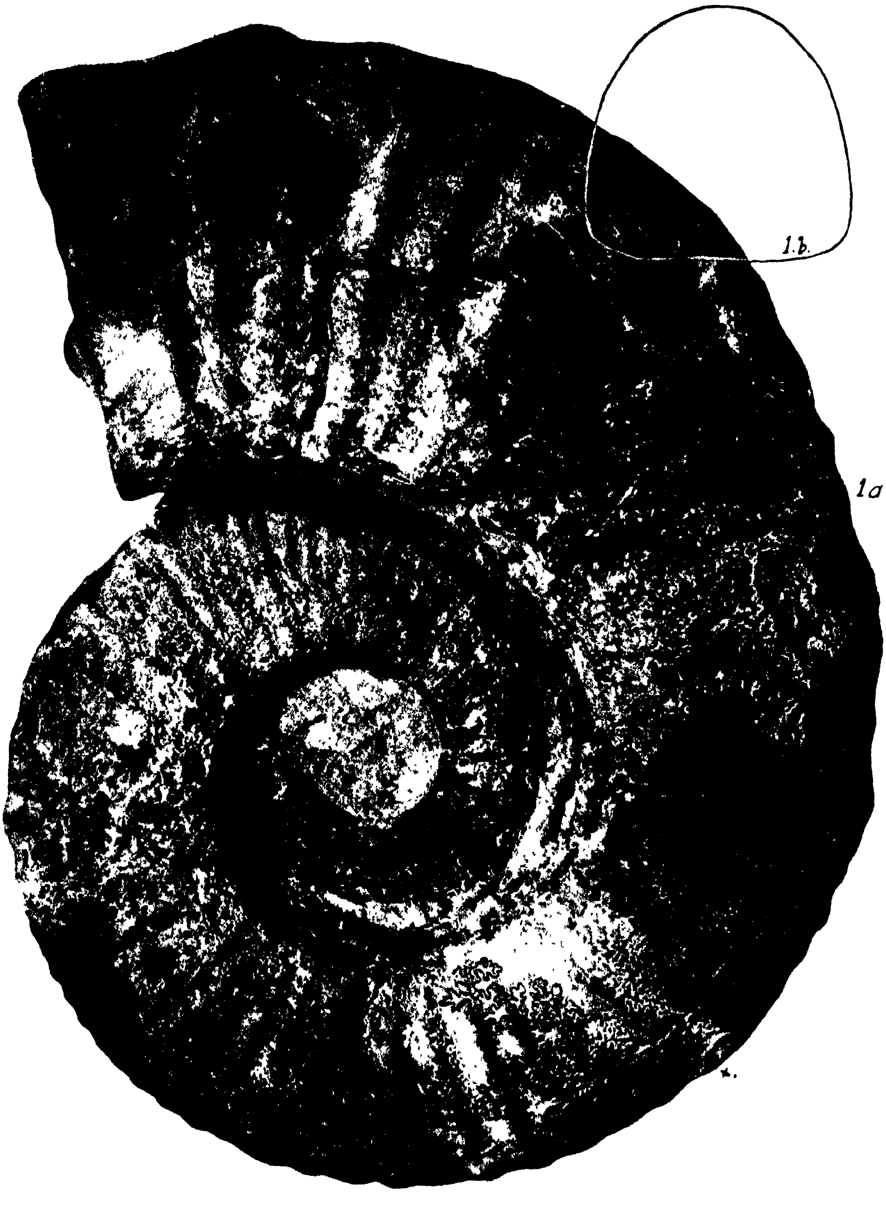
5.

W. Tams, Photo.

Plate XXXV.

(All figures natural size unless otherwise stated.)

1. *Tropæum lampros* (Etheridge fil.). (*a*) Lateral view, (*b*) whorl-section taken at ×. See also Pl. XXXVII., fig. 4. Glendower Station, Flinders River (B.M. Coll.); Roma Series (Lower Gargasian). × 0·5.

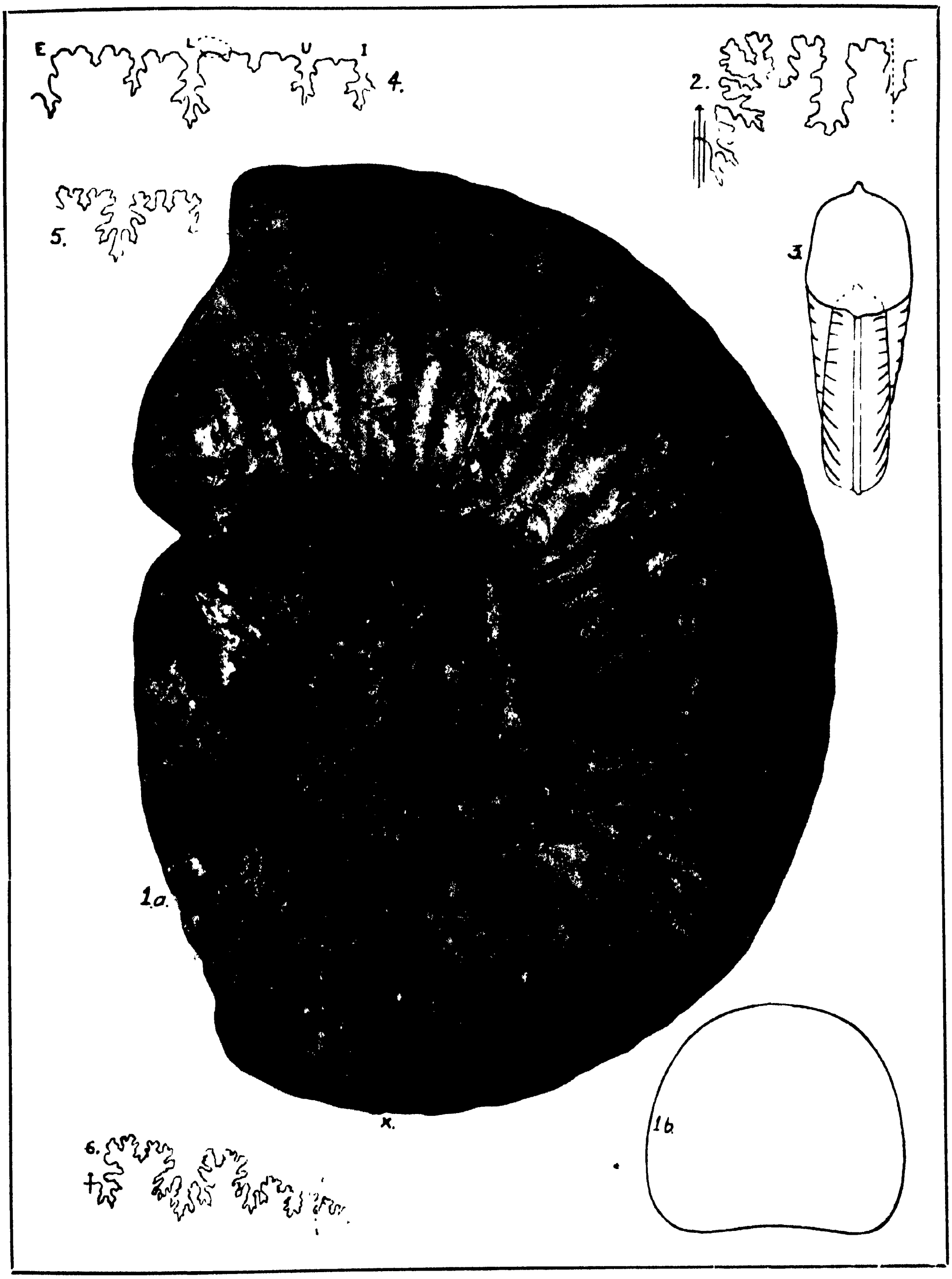


W. Tams, Photo.

Plate XXXVI.

(All figures natural size unless otherwise stated.)

1. *Tropæum rarum* sp. nov. Holotype; (*a*) lateral view, (*b*) whorl-section taken at ×. Walsh River (Q.M. Coll.); Roma Series (Lower Gargasian). × 0·78.
2. *Prohysteroceras richardsi* sp. nov. Septal suture of specimen from Ward River, 23 miles S.W. of Tambo (F.W.W. Coll.); Tambo Series (Upper Albian).
3. *Prohysteroceras richardsi* var. *nitidum* nov. Whorl-section of holotype. South-Central Queensland (A.M. Coll.); Tambo Series (Upper Albian).
4. *Labeceras papulatum* sp. nov. Septal suture of holotype (see Pl. XXXIX., fig. 3). × 2.
5. *Labeceras compressum* sp. nov. Septal suture of holotype (see Pl. XXXIX., fig. 5). × 1·5.
6. *Beudanticeras* cf. *flindersi* (McCoy). Septal suture of specimen from Hughenden (Q.M. Coll.). × ·2.



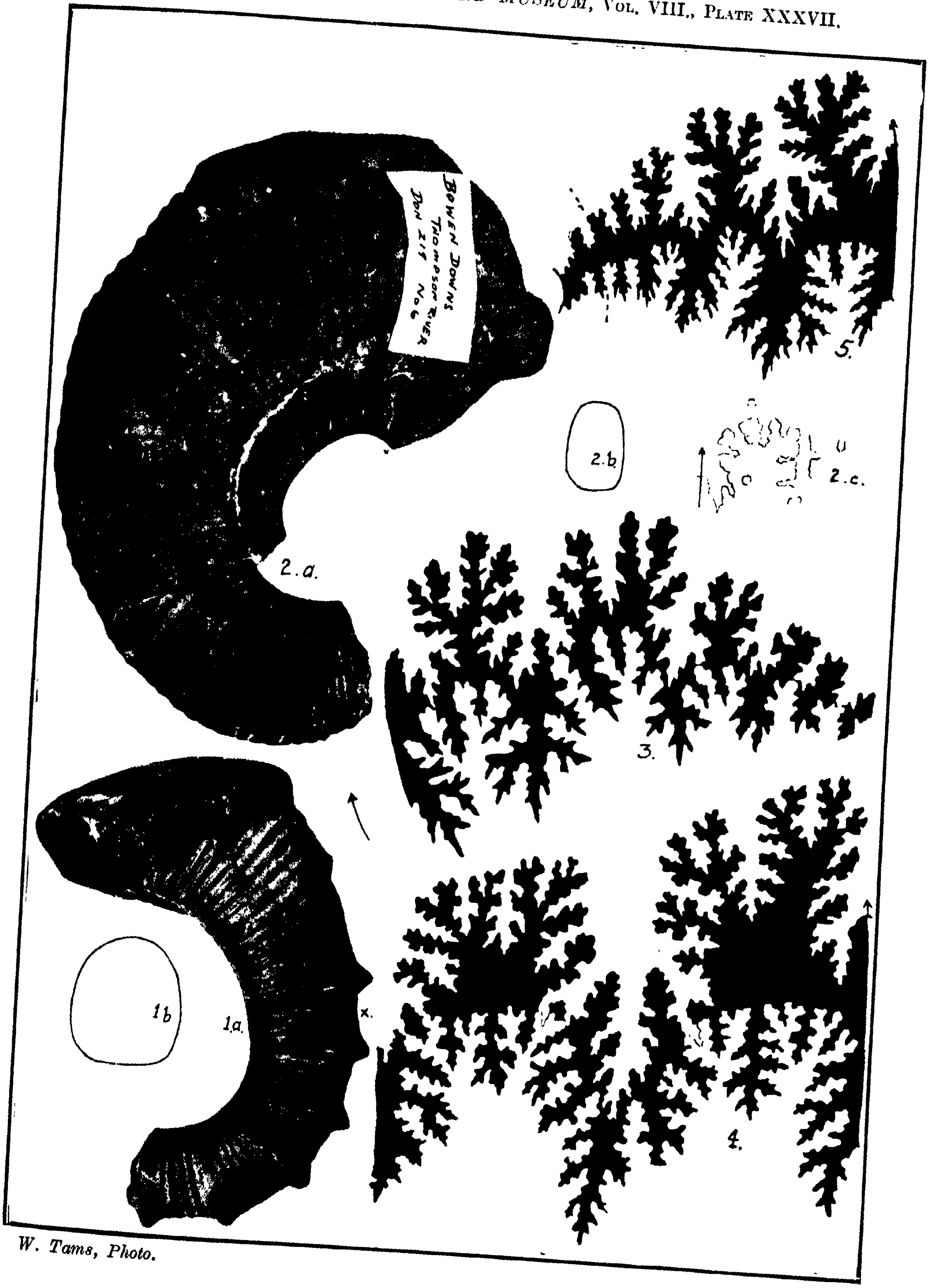
W. Tams, Photo.

Plate XXXVII.

(All figures natural size unless otherwise stated.)

1. *Australiceras irregulare* (Tenison-Woods). (*a*) Lateral view, (*b*) whorl-section at ×. Walsh River (Q.M. Coll.); Roma Series (Upper Bedoulian).
2. *Myloceras davidi* sp. nov. Holotype; (*a*) lateral view, (*b*) whorl-section at ×, (*c*) septal suture. Bowen Downs, Thomson River (Q.M. Coll.); Tambo Series (Upper Albian).
3. *Aconeceras walshense* (Etheridge fil.). Septal suture of specimen figured on Pl. XXXIV., fig. 1. × 4.
4. *Tropæum lampros* (Etheridge fil.). Septal suture of specimen figured on Pl. XXXV.
5. *Puzosia longmani* sp. nov. Septal suture of holotype. See Pl. XXXIX., fig. 1.

MEMOIRS OF THE QUEENSLAND MUSEUM, Vol. VIII., Plate XXXVII.

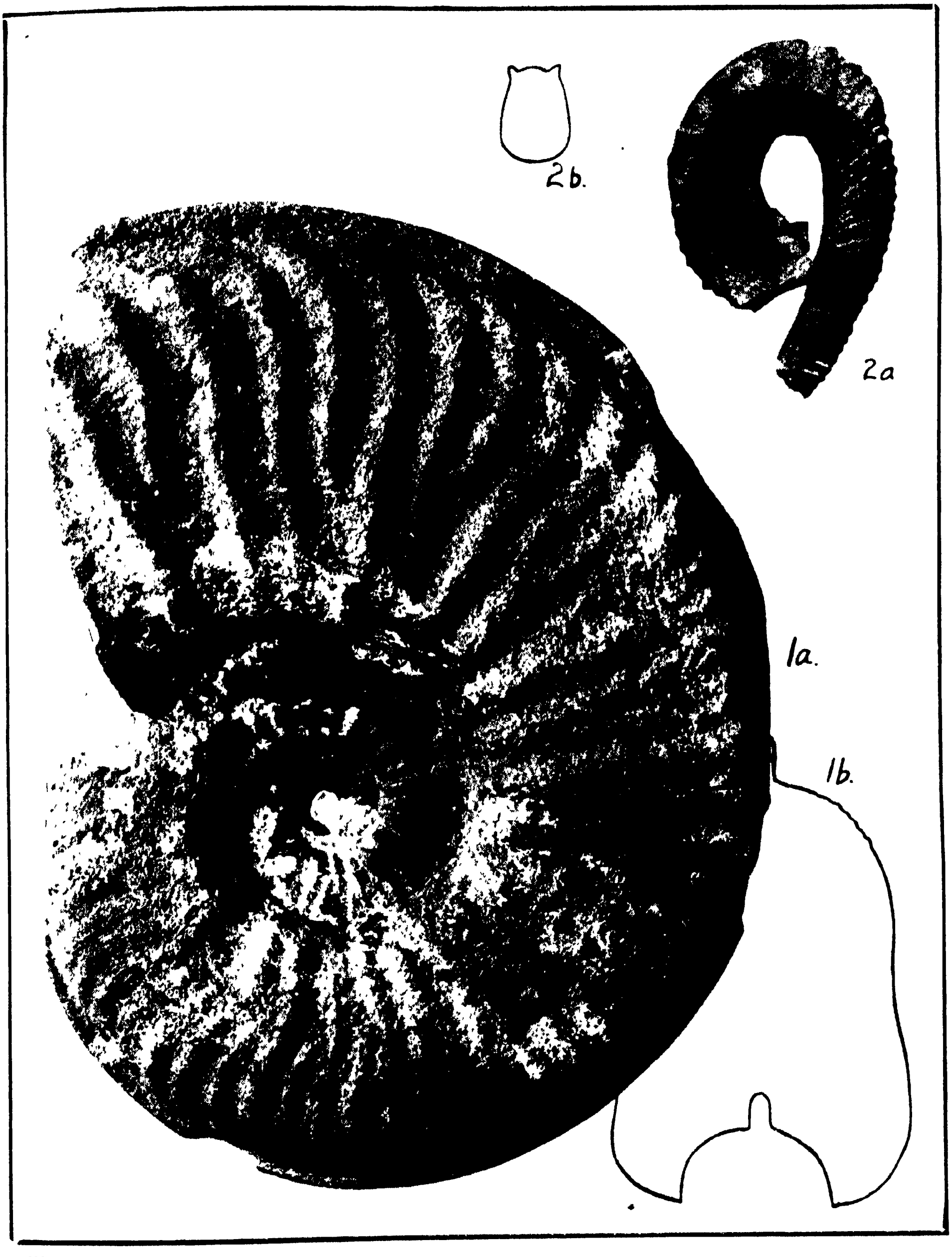


W. Tams, Photo.

Plate XXXVIII.

(All figures natural size unless otherwise stated.)

1. *Prohysteroceras richardsi* sp. nov. Holotype; (*a*) lateral view, (*b*) whorl-section. Augathella (Q.M. Coll.); Tambo Series (Upper Albian).
2. *Appurdiceras etheridgei* sp. nov. Holotype; (*a*) lateral view, (*b*) cross-section. Kensington (N.M. Coll.); Tambo Series (Upper Albian).

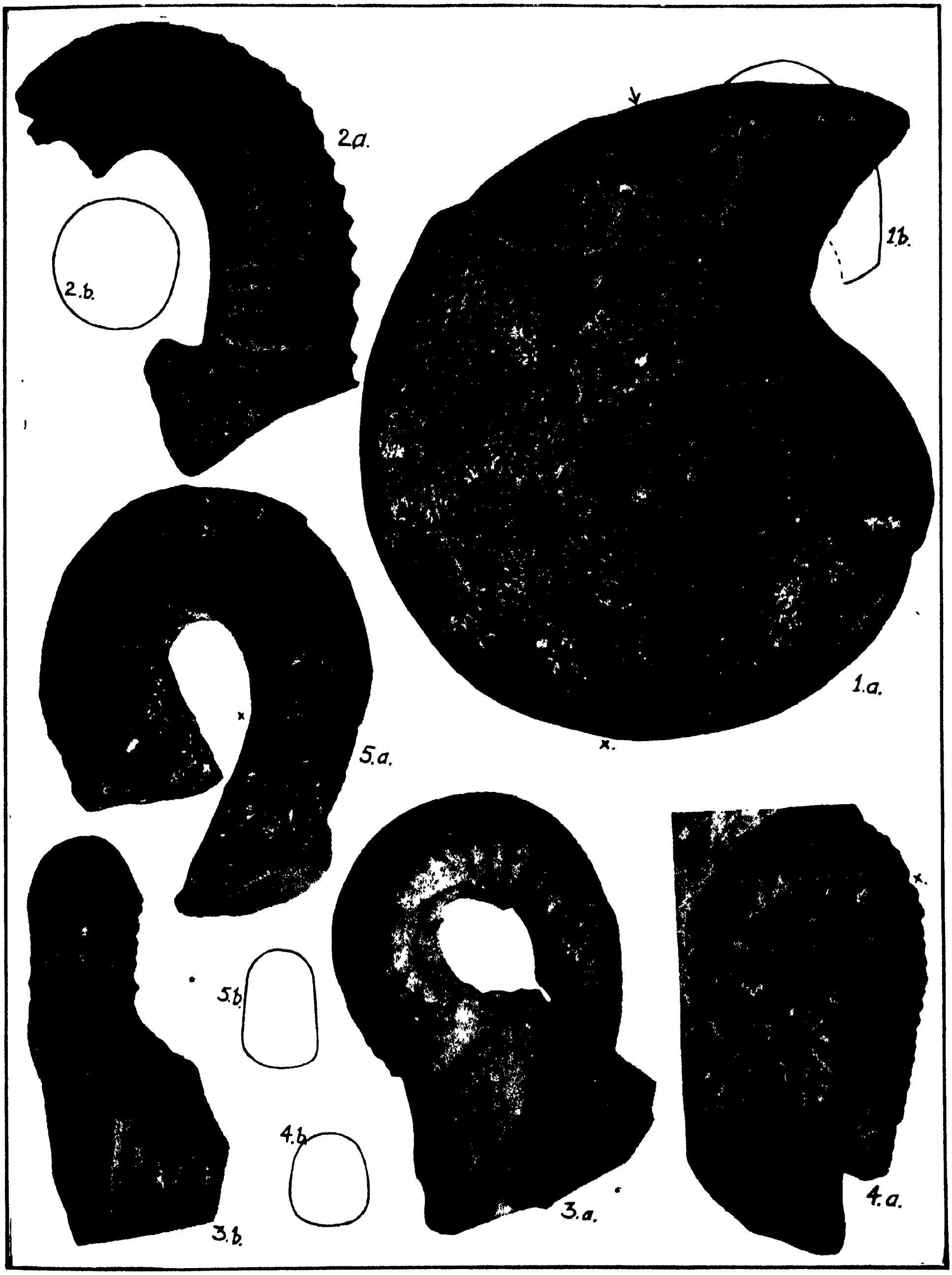


W. Sanderson, Photo.

Plate XXXIX.

(All figures natural size unless otherwise stated.)

1. ***Puzosia longmani*** sp. nov. Holotype; (*a*) lateral view, (*b*) whorl-section ×. Beginning of body-chamber marked by arrow. Barcoo River (Q.M. Col.); Tambo Series (Upper Albian).
2. ***Hamites*** **aff.** ***maximus*** J. Sowerby. (*a*) Lateral view, (*b*) whorl-section at proximal end. Body-chamber. Ward River, head of Warrego (Q.M. Coll); Tambo Series (Upper Albian).
3. ***Labeceras papulatum*** sp. nov. Genotype, holotype; (*a*) lateral view, (*b*) ventral view. Longreach (B.M. Coll.); Tambo Series (Upper Albian).
4. ***Labeceras bryani*** sp. nov. Holotype, showing aperture. The impression of the dorsum of the spiral portion is preserved at the base of the specimen (not shown in the figure); (*a*) lateral view, (*b*) whorl-section at ×. South-Central Queensland (A.M. Coll.); Tambo Series (Upper Albian).
5. ***Labeceras*** *compressum* sp. nov. Holotype; (*a*) lateral view, (*b*) whorl-section at ×. Tower Hill, Muttaburra (Q.M. Coll.); Tambo Series (Upper Albian).

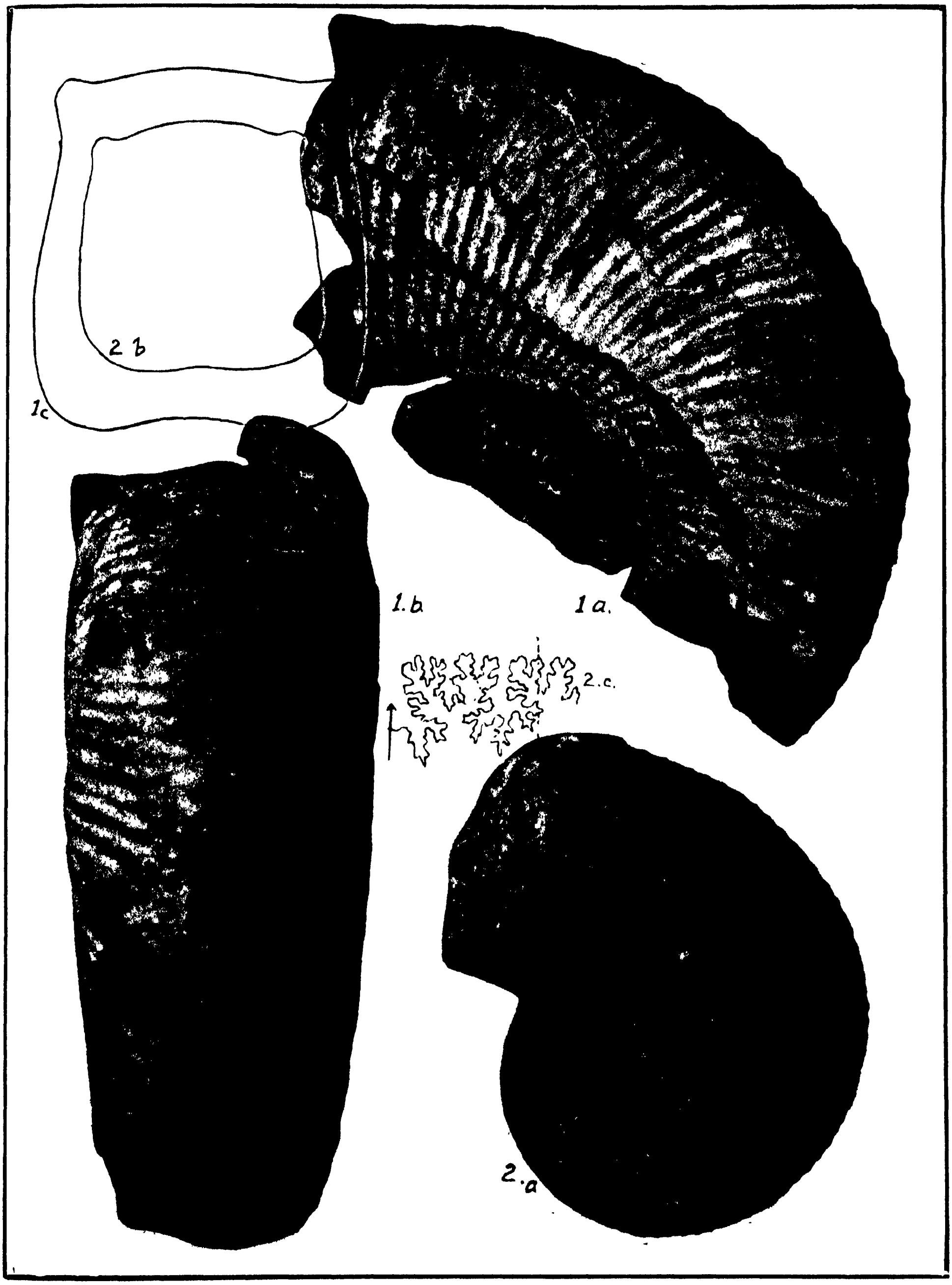


W. Tams, Photo

Plate XL.

(All figures natural size unless otherwise stated.)

1. *Aleteceras tardicostatum* sp. nov. Holotype; (*a*) lateral view, (*b*) ventral view, (*c* whorl-section at the distal end. South-Central Queensland (A.M. Coll.); Tambo Series (Upper Albian).
2. *Aleteceras plectoides* (Etheridge fil.). Young specimen; (*a*) lateral view, (*b*) whorl-section at the distal end, (*c*) septal suture. Walsh River (Q.M. Coll.); Tambo Series (Upper Albian).

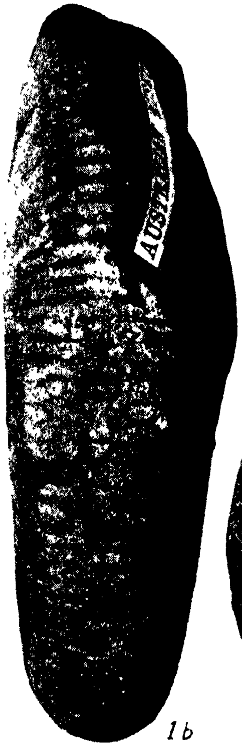


W. Tams, Photo.

Plate XLI.

(All figures natural size unless otherwise stated.)

1. *Myloceras orbiculus* sp. nov. Holotype; (*a*) lateral, (*b*) ventral view. Penultimate chamber shaded. Beaconsfield (A.M. Coll.); Tambo Series (Upper Albian).
2. *Myloceras ammonoides* (Etheridge fil.). (*a*) Lateral, (*b*) ventral view. Dalhousie Springs (A.M. Coll.); Tambo Series (Upper Albian).
3. *Sanmartinoceras olene* (Tenison-Woods). (*a*) Lateral view, (*b*) whorl-section. Walsh River (Q.M. Coll.); Roma Series (Upper Gargasian).



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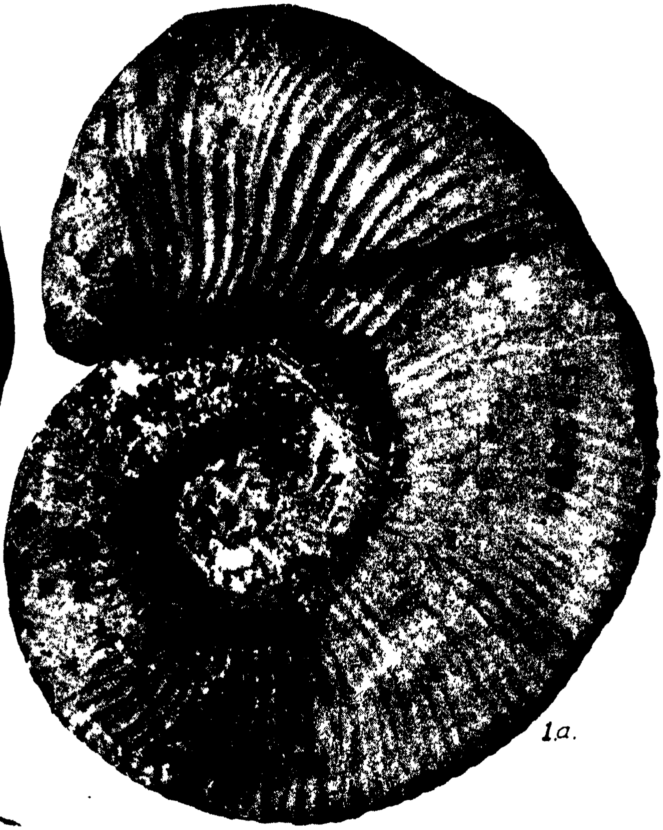

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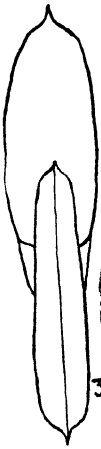

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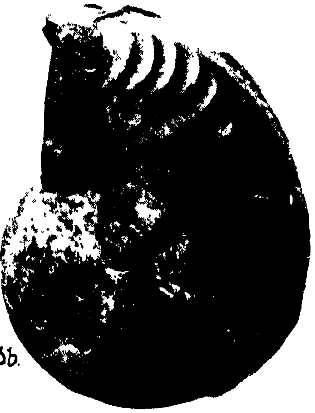

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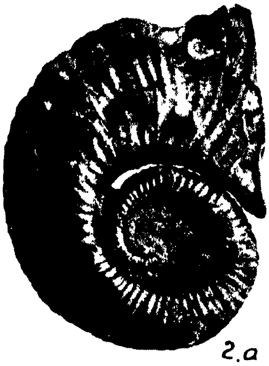


2.a

W. Tams and W. Sanderson, Photo.

NEW SPECIES OF QUEENSLAND CERCOPIDÆ (HOMOPTERA).

BY HENRY HACKER, F.E.S.

(Plate XLII.)

CERCOPINÆ.

CLOVIA LOXOSEMA new sp. (Figure 1).

Female—Head twice as wide as long, triangular, rounded apically, almost flat dorsally, finely punctate; pronotum anteriorly finely punctate, posteriorly more coarsely punctate-striate; scutellum finely punctate-striate; frons pitted down the centre, becoming smooth towards clypeus; clypeus pyriform, convex, smooth centrally; tegmina finely punctate.

Head, pronotum, and scutellum luteous; the head has three transverse brown stripes—the first following the outline of vertex, strongly arched, median and basal stripes less curved; the pronotum has four transverse stripes—the first slightly convex, the second straight, the third concavely curved, the fourth widened angularly at each side on the posterior border; ventral surface luteous, base and apex of frons blackish brown, with about seven brown oblique stripes on each side; clypeus black; rostrum flavescent, apex fuscous, extending to the meso-coxæ; tegmina fuscous, lighter apically; a broad pale stripe from costa before middle extends obliquely across corium and clavus, terminating near base; a curved pale stripe extends from just beyond middle of costal margin to apex of tegmen; another pale stripe runs parallel to the first mentioned, from the middle of corium to the posterior margin of clavus; the cubital and anal veins after passing this stripe continue pale; all light parts on tegmina more or less suffused with scarlet vermilion, which is brightest on the first-mentioned oblique stripe; legs fulvous, posterior pair flavescent. Length 13 mm., exp. 17 mm.

Male.—Tegmina uniformly fuscous, with all the above-mentioned pale markings bright scarlet vermilion; frons, excepting the extremities, luteous; oblique ridges concolorous.

Habitat.—National Park, Mount Tambourine, Q.; Tooloom, N.S.W. (H. Hacker).

Types in the Queensland Museum, *Ho. 3027.*

Described from twelve females and two males.

EOSCARTA CHINAI new sp. (Figure 2).

Female.—Head posteriorly declivous, apically flat, shape (excluding the eyes) semicircular, centrally longitudinally carinate; ocelli red, about twice as far from the eyes as from each other; outside the ocelli are two sulci, more separated anteriorly; frons smooth, anteriorly swollen, projecting crescent shaped beyond vertex when viewed from above, somewhat flattened along centre, with a row of obscure transverse ridges on each side; pronotum transversely punctate-striate, widest at base of tegmina; a central longitudinal carina, most distinct anteriorly, on each side of which is a smooth callose spot; scutellum as wide as long, finely transversely striate, tegmina rather narrow, subparallel, finely punctured; a groove at base below costa, in a line with which, just before middle, is a round embossed spot.

Head fuscous, lighter on sides of anterior margin, and posteriorly between ocelli and eyes; pronotum fuscous, lighter on each lateral angulation: scutellum and abdomen dorsally dark brown, pygofer lighter; frons black, apically fuscous; clypeus and rostrum light brown; legs brown, posterior pair yellowish brown, tarsi and tips of spines blackish, ventral surface of abdomen brown; tegmina fuscous, covered with fine light pubescence; a long triangular whitish patch on anterior border past middle, continuing to apex, nervures brown; wings hyaline, iridescent, nervures brown. Length of head and body 6 mm, exp. 14 mm.

Habitat.—National Park, Q. (H. Hacker).

Type in Queensland Museum, *Ho. 3028*

Described from one female.

This species has been named after W. E. China, of the British Museum, to whom we are indebted for much assistance in identifying specimens.

PTYELUS HOMOCHROUS new sp. (Figure 3).

A large robust brown species, clothed with fine golden pubescence

Female.—Head about four times wider than long, somewhat angularly rounded, anterior margin of vertex acute, centrally carinate, behind which is a large triangular impression; ocelli further from each other than from the eyes, in a shallow transverse sulcus; between each ocellus and eye is a small callose spot; pronotum finely punctate-striate, anteriorly rugate; a central sulcus, at the bottom of which is an impressed line, continuing on middle of pronotum as a feeble carina, which does not reach the posterior border; anteriorly, on each side of sulcus, are several obscure callose spots; scutellum longer than wide, finely transversely striated; frons moderately convex, on each side of which are eleven transverse ridges without pubescence, clypeus short, not passing anterior coxæ, centrally smooth; rostrum two-jointed, reaching meso-coxæ; tegmina with level surface, minutely punctured, elongate, anterior margins moderately arcuate; wings hyaline, dusky towards apical and posterior borders.

Head, body, and legs dark brown tinged with green; legs pubescent, spines and tarsal claws blackish; tegmina brown, darker along anterior border; eyes black; ocelli light red. Length of head and body 13 mm., exp. 32 mm.

Male.—Similar to female but smaller, length of head and body 10 mm., exp. 22 mm.; tegmina darker at base.

Habitat.—Brisbane, Q. One female on Acacia, 25th March, 1925; one male, Brisbane, 5th November, 1918. One male, Tooloom, N.S.W. (H. Hacker).

Types in Queensland Museum, *Ho. 3029.*

Described from three specimens.

The greenish tinge seems to be present only on recently captured specimens; in the male, captured in 1918, it is entirely absent, the colour being pure brown.

PHILAGRA FULVIDA new sp. (Figure 4).

Female.—Head as long as wide, slightly ascendant, compressed apically, with a dorsal carina, and a lateral one running to each eye, in front of which they become strong acute ridges; frons elongate, centrally smooth, with a number of oblique ridges on each side; clypeus smooth, rostrum reaching the intermediate coxæ; pronotum and scutellum punctate, the latter more finely; tegmina closely and finely punctured, amongst which are scattered many large impressed punctures; widest one-third from base, narrowing apically, costal margin strongly arcuate; entire dorsal surface covered with a fine golden pubescence.

Colour fulvescent; apex of cephalic prolongation, large punctures on tegmina, and two oblique fascia through centre of tegmina, fuscous; space on tegmina enclosed by fasciæ, an obscure fascia at apex of clavus, central stripe on frons and clypeus, luteous; wings dusky brown, iridescent, darker on apical margin; abdomen reddish brown; ovipositor blackish.

Length 11 mm., exp. 18 mm.

Male.—Differs from the female in its smaller size—length 8·5 mm., exp. 15 mm.—and its shorter almost wedge-shaped head, about as wide as long.

Habitat.—National Park (3,000 ft.), and. Mt Tambourine, Q. (H. Hacker).

Types in Queensland Museum, *Ho. 3030.*

Described from nine females and sixteen males.

Easily distinguished from *P. parva* Stål by the shorter and stouter cephalic prolongation, the large dark punctures, and the differently shaped fasciæ on tegmina.

PHILAGRA CONCOLOR new sp. (Figure 5).

Female.—Head produced, somewhat tapering, inclined upward, acutely pointed, with carina as in *P fulvida*; frons and clypeus have a smooth light central ridge, sides of frons have a series of oblique ridges; punctures on head, pronotum, and tegmina somewhat finer than in *P. fulvida*; tegmina finely punctured with larger scattered punctures among them; the whole dorsal surface is the same shade of fulvo-olivaceus, excepting the tapering apex of head, and the extreme tips of tegmina, which are fuscous; apical half of rostrum, anterior tarsi, intermediate claws, tips of spines and the claws on posterior legs, blackish; abdomen reddish brown, anal style and ovipositor fuscous. Length 10·5 mm, exp. 16 mm.

Male.—Head slightly shorter and stouter than in the female; size smaller—length 9 mm, exp 14 mm.

Habitat.—National Park, Mapleton, Southport, Q; Tooloom, N.S W. (H. Hacker); Mt. Tambourine, Q. (W. H. Davidson)

Types in the Queensland Museum, *Ho. 3031.*

Described from eight females and ten males

Close to *P. fulvida*, but differs in the immaculate tegmina, without any indication of either light or dark fascia: the more tapering prolongation of head, and slightly finer puncturation.

BATHYLLUS ALBICINCTUS (Er.).

Erichson's description is from a male. The female is without the basal pronotal white stripe, the head, pronotum, and scutellum being pale brown, unicolorous; tegmina pale brown, the curved white fascia does not enter the clavus, as in the male, but in some specimens is indicated by a small white spot near the apex; apical half of tegmina white, reticulate; nervures on apical part white, narrowly bordered on each side with light brown.

Hab.—Peel Island, Moreton Bay (W. A. T. Summerville), October. Occurring in numbers on a creeping vine growing near the beach.

MACHÆROTINÆ.

POLYCHÆTOPHYES PERKINSI new sp. (Figure 6).

Female.—Head transverse, triangularly produced, extending in front of eyes about the width of one; ocelli in centre of vertex, close to each basal corner of frons, which is on the dorsal part of head; frons dorsally about one-third the width of vertex, widening slightly and swollen ventrally; pronotum wider than head, coarsely but shallowly transversely wrinkled; scutellum triangular, longer than wide, finely striated, apex acute; tegmina nitid, coarsely punctured; nervures forming raised ridges on surface; wings hyaline, iridescent, apical half with minute hairs.

Head dorsally, anterior border of pronotum, scutellum, and pleura yellow, pronotum, excepting anterior border, pale green, front below a straight line level with eyes, clypeus, legs, and abdomen, black, tegmina nitid, varying from castaneous to nigricent (according to maturity), the blackish tegmen viewed by transmitted light is castaneous with an opaque triangular patch at base of costal area, and two obscure paler spots arranged diagonally just beyond Length of head and body 6 mm, exp 15 mm

Habitat —Stanthorpe, Q (F A Perkins)

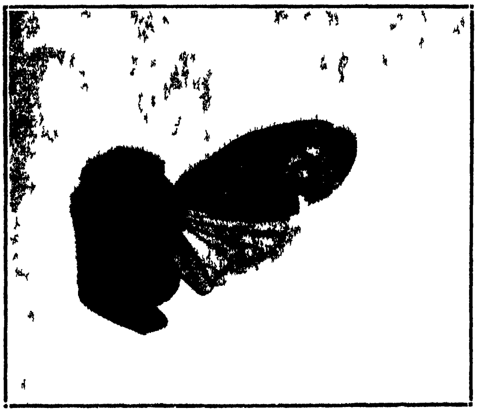
Types in the Queensland Museum *Ho 3032*

Described from two females

POLYCHÆTOPHYES APPENDICULATA new sp (Text figure 1)

A brown species distinguished by a large rounded appendix on each tegmen, which in repose is bent around the posterior extremity, overlapping

Female —Eyes black narrowly bordered with light brown, clypeus rounded, swollen, with transverse parallel brown stripes rostrum light brown, tip darker reaching to intermediate coxæ pronotum large declivous at sides strongly transversely striated, posterior margin deeply excavated in the middle, scutellum twice as long as wide, more finely striated tegmina pale yellowish brown, subhyaline, a brown fascia crosses tegmen about centre, darkest on costa; a few cross-veins in costal cell, nervures light basally, becoming darker towards apex of tegmen, where they are cut off by an oblique line, beyond which is a rounded parallel-sided appendix, clavus pale basally, the remainder brown, claval vein forks about middle.



Text figure 1

Head, pronotum, and scutellum reddish brown, tip of scutellum whitish; abdomen dorsally black, the two basal segments centrally whitish, ventral surface and genitalia brown; legs brown, posterior tibiæ, spines and claws blackish.

Length (wings closed) 5 mm, breadth 3 mm.

Hab.—Bunya Mountains, Q. (3,000 ft), December (H Hacker)

Type in the Queensland Museum, *Ho 3051*

Described from one female

EXPLANATION OF PLATE XLII.

Fig. 1.—*Clovia loxosema* n. sp., ♀ (Upper) ♂ (Lower), x 3.

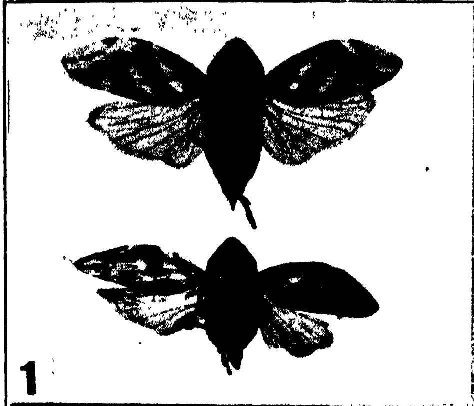
Fig. 2.—*Eoscarta chinai* n. sp., ♀, x 4.

Fig. 3.—*Ptyelus homochrous* n. sp., ♀ x 1·8.

Fig. 4.—*Philagra fulvida* n. sp., ♀ (Upper), ♂ (Lower), x 3.

Fig. 5.—*Philagra concolor* n. sp., ♀ (Upper), ♂ (Lower). x 3 5.

Fig. 6.—*Polychætophyes perkinsi* n. sp, ♀ ♀, x 3·5.



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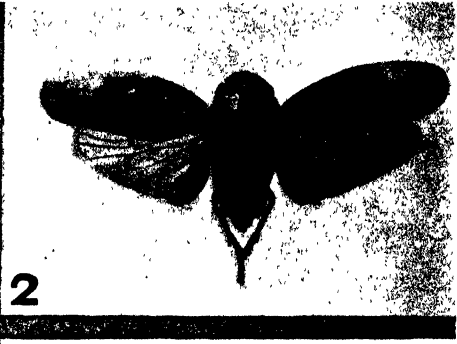

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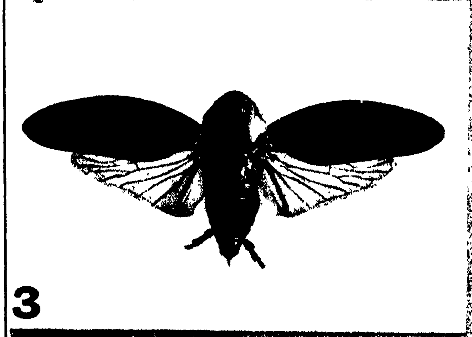

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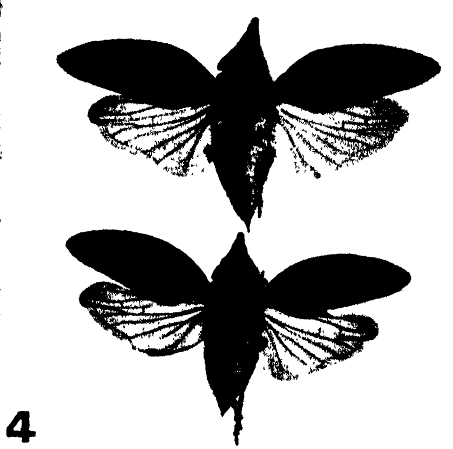

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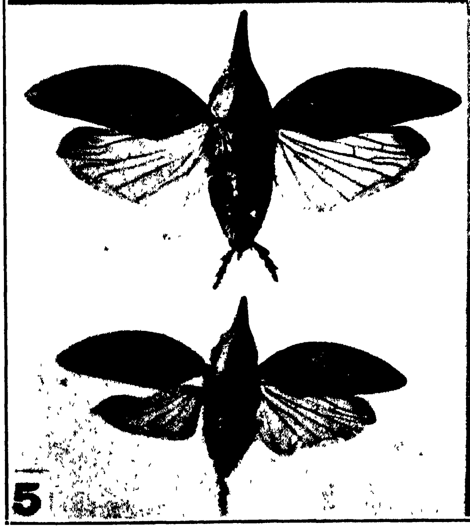

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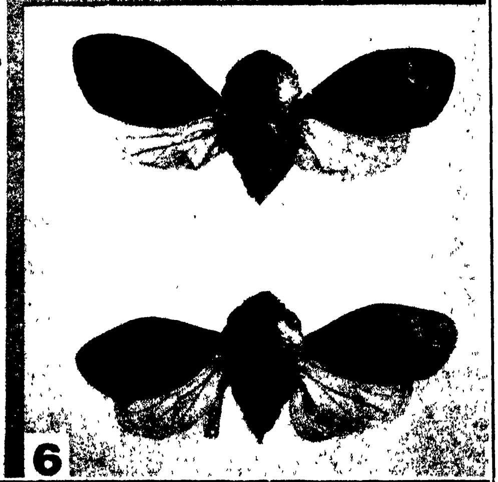

6

Queensland Cercopidæ.

Photos., H. Hacker.

CUSTOMS AND LANGUAGE OF THE WESTERN HODGKINSON ABORIGINALS.

By Francis Richards.

The tribe under review is known as the "Wakoora," and inhabited an area of about 40 sq. miles, centring on Mt. Mulligan (west from Cairns, North Queensland), living mostly on the top and the western slopes of that mountain. Two other tribes, viz., "Chunkunberry" and "Wun-yurika," had almost identical language and customs. The latter extended along Mulligan Creek, south of the southern end of Mt. Mulligan, an area of about 60 sq. miles; the former lived from where Thornborough now is to Deep Creek, an area also of about 60 sq. miles. All this country is rugged, rocky, and sparsely wooded.

The customs of these tribes are somewhat similar to those noted by Mowbray for the tribe living in Granite Ranges at the head of Mitchell River.[1]

History.—In their original wild state these tribes probably numbered about 200 in each. Their numbers were rapidly diminished following contamination with the whites and Chinese on the opening of the Hodgkinson Goldfield in 1875, mainly by native police, influenza, and venereal disease. It is probable that the Wakoora was the dominant tribe, as they outlived and absorbed the other two. By 1890 the Wakooras and Wun-yurikas had coalesced, with great enmity between them and the Chunkunberries; but by 1900 the Chunkunberries had come down and merged with the other two, with headquarters around Woodville. Since then these tribes have gradually dwindled away, until at present about twenty remain—mostly original Wakooras. These survivors are all old, the young "bucks" and "gins" having passed out under combined stress of the evils of whites and Chinese.

Clothing, Ornaments, and Vessels.—The whole tribe lived together in several camps. They built humpies and lived in them during cold or wet weather. These humpies were built of flexible pieces of bush timber bent over to form a beehive-like structure, thatched with tea-tree leaves and bark. They were 3 to 4 ft. high, and had one small entrance, before which at night a fire was built, serving the double purpose of keeping them warm and repelling the mosquitoes.

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[1] E. W. Mowbray, in "The Australian Race," by E. M. Curr, vol. 11, pages 402-407, 1886.

Editor's Note.—Mr. Francis Richards has been familiar with the aboriginals of the Mount Mulligan district since boyhood, having lived in close contact with them for about forty years. He desires to acknowledge the very able assistance given by Dr. T. M. S. Hall in the preparation of this paper.

They wore no clothing, but on cold nights covered themselves with tea-tree bark and slept in their humpies or behind breakwinds of bushes and bark, surrounded by little fires. For ornaments they wore feathers in their hair. necklets of grass beads (made by threading segments of grass on string), and sometimes a single large white shell was suspended around the neck. Numbers of small pieces of mussel-shell would be squared by rubbing on stones, bored, threaded on string, and tied round the forehead. The string for these purposes was made from the inner bark of the currajong tree I never saw quartz worn as an ornament.

They made paints of red or white clays mixed with water or saliva (I never saw grease or fat used for this purpose), and painted their whole bodies, usually in stripes. They scarred their bodies by cutting with quartz stones, and were able to raise scars to a height of about ½ in. above the skin These scars were confined to the chest, shoulders, and upper arms; a few scarred their noses. Though painting was limited to males of all ages, both sexes scarred themselves. The right central incisor was knocked out with a stone, and the septum of the nose was pierced with a sharp stick and a piece of grass about 3 in. long was worn through it.

Circumcision or operations on the urethra were not practised; in fact it was considered a matter for great merriment among the rest of the tribe if a member had a short foreskin (charra-galah). A bald head was held in the same ridicule, though I only knew one Wakoora to have a bald head. Before the advent of the whites, these natives lived to a great age. I knew a number of very old men and women, some blind with age and snow-white.

Women carried only one type of bag. This was made very cleverly of knitted grass, and was suspended from the head with string made from the inner bark of the currajong. The men carried small, narrow, string bags about 1 ft. long, and these were used to carry spear-making implements, wax, gum, sinews, sharp stone, the fire-maker, &c.

Their only vessel was made from the soft inner bark of the ironbark. It was fashioned into the shape of a boat, each end being secured with a wooden spike. In this vessel yams were prepared for eating by being scraped with mussel-shells into a pulpy mass, or figs pulped with the hand. In it infants were also carried by the mother, suspended from her back by a band placed on her forehead. A smaller type of the same vessel was used for holding drinking water.

Fire was made by rubbing sticks together. A piece of round hard-wood 1 ft. long, the thickness of a lead-pencil, was rapidly rotated between the palms of the hands in a small depression in dry, soft wood. Turn-about was taken in rotating the stick. As soon as it began to smoke, they sprinkled ground-up tea-tree bark on the glowing point, and this was blown into a flame. This process usually took about five minutes. At most times a large fire was kept always alight in the camp, in charge of the gins.

Foods.—Their food consisted of any animal, bird, reptile, or fish that they could catch, and eggs, yams, and fruits. Children and women were not allowed to eat the most succulent foods, such as plain turkey, black duck, goanna, emu, etc. They believed that they would break out in sores if they ate these foods, and consequently never touched them. The wisdom of this from the buck's point of view is obvious. They cooked all meat but ate yams and fruit raw. Cooking was done on open fires or in primitive ovens made of flat stones. The oven was a hole in the ground, lined with hot stones into which the meat was placed and covered with tea-tree bark. The hole was then covered with earth. All animals were cooked whole and uncleaned.

Cannibalism was practised, but was limited to members of other tribes. They never ate their children; on the contrary great love was manifested by parents to both their children and relatives.

Hunting.—The game was obtained by the males; fruits, yams, and fish (by the "grass" and poison methods) by the females. They hunted the kangaroo by two methods. The usual was to stalk and spear the kangaroo, the hunter being covered with green bushes or grass. The other method was to surround an area with bush fires, leaving a narrow space at one point. The kangaroos were speared or killed with nulla-nullas as they rushed through the opening. The rock wallabies were roused by shouting and killed by throwing nulla-nullas at them. Emus and plain turkeys were stalked in a similar manner to the kangaroo. Ducks were speared in the water, the hunter being immersed, with his head disguised with water lily leaves. 'Possums, bush rats, and native cats were located in hollow trees by throwing stones into the hollows and listening for the sound of the stone falling on their bodies. When one was discovered the tree was cut open with tomahawks.

They had three methods of fishing. When the rivers were full the fish were speared with a special fish-spear. When the water was low the fish in the waterholes were poisoned with the fruit of a species of acacia known locally as the soap tree, or with the leaves of a tree called by them "Rukka." This tree resembles the guava tree. These poisons made the fish rise to the surface, where they were speared. The third method was employed in shallow holes. A barrier of grass was rolled from one end of the hole to the other, driving the fish before it, where they were caught by hand.

These people never stored food. It was either a feast or a famine with them. As I remember these natives, they were always well nourished and strong.

Marriage.—Marriages were made within the tribe except when gins were acquired by conquest. Marriage between close relatives was strictly forbidden.

and never occurred. The greatest insult that could be offered one of these natives was to insinuate that he was guilty of incest. Wives were never bartered. Occasionally a native would take another man's wife, the ownership of the lady then being decided by combat. Some men had as many as three wives.

Marriages were contracted in four ways—

(1) A youthful gin would be given by her parents to the man. The woman was generally about the age of puberty, the man being about twenty.

(2) The usual method, between young couples of about equal age, was for the couple to run away and remain in the bush, alone, for a few days. When they returned they were considered married.

(3) When couples of mature years wished to marry, the man would light a fire and pitch his camp near that of the woman. When she went and slept with him they were married.

(4) A man would forcibly detain a woman, and if he could hold her she was his. The methods of detention were drastic. I have known women to be tied up for days and beaten until they became tractable

A peculiar custom existed in regard to eloping with another man's wife The couple would run away and live in the bush for several days In the meantime the husband was going around vowing vengeance On their return the couple declared that the "Eekoo" or "mountain devil" had taken and detained them They always extended the tale to rape for the woman and sodomy for the man by the "Eekoo" This excuse satisfied the husband, who thereupon resumed normal relations with his wife.

There were no ceremonies of any kind in connection with marriage. Husbands and wives were not as a rule very faithful to each other.

Abortion was very common, and was procured by the woman taking a very long walk and then jumping into a waterhole from a height of about 20 ft., with arms and legs spread and body leaning a little forward This method was reputed to be unfailing.

Dancing and Games—They had three types of corroboree, and these were their only dances. No fixed periods were observed, although they preferred moonlight nights They were held at irregular, frequent intervals; there was scarcely a week went by without one. Sometimes the dances were held in an open space without preparations, but usually they built a breakwind of two lines of bushes and danced between the two. On rare occasions they would erect two painted sticks, resembling barber's poles. The men were always well painted and decorated for the occasion, and small fires would give sufficient light.

In the most common dance the gins would sit in a semicircle and with their hands together would beat between their thighs, making a noise somewhat resembling a drum, which could be heard for half a mile. There was only one singer. He always stood at the right-hand end of the semicircle of women. He would beat time by knocking boomerangs or other sticks together, and sing. The dancers, consisting of men, would march up in anything from single file to fours. They stamped their feet, and jerked their clenched hands in time with a grunt which they emitted at each stamp. The man at the rear of each file always kept his hands clasped behind his back. The singer sang with one breath, and when his voice stopped for breath the dance ended with a loud yell from the dancers, who immediately turned and raced back to the starting point. This procedure was repeated indefinitely, the corroboree often lasting up to four hours.

In the second dance, the gins and singers are arranged as before, but the dancers—stamping, grunting, and jerking their clenched fists—march in a circle around a man lying on the ground going through contortions meant to imitate masturbation. As before, the singer's exhaustion ends the dance.

The third dance was performed without singing and was a solo dance. The dancer, who was always a man, simultaneously beat his elbows against his ribs, clapped his hands in front of his abdomen, shook his legs, feet apart, and blew out of his mouth, making the sound "tremble" with his lips.

In all dances, up to about twenty men and a corresponding number of women would be participating, the rest of the camp being spectators. Some natives were noted and admired for their corroboree singing.

Games.—These tribes played three games, the simplest of which was target practice with spears. The target was of bark placed in the sand, and spears were thrown at it from a distance of about 50 yds.

In another game a circle of green bark was cut about 8 in. in diameter, and thrown crosswise along the ground like a wheel in front of a number of men who threw spears at it as it passed They seldom missed their mark.

The third game took place only once a year and was played every day for about a week. During this period all the men had a piece of string tied tightly round their heads, under the ears and over the nose, about half an inch from the tip. The effect of this was to flatten the nose and completely prevent nasal respiration. The game was a kind of wrestling, and took place in the sand of the river bed, at a certain time every afternoon. Two heaps of sand about 1 ft. high were built up about 15 yds. apart, and called "the baby" (karkoo). Immediately in front of each karkoo was an equal number of wrestlers and immediately behind it a club was placed on the sand. A man from each side advanced, met in the middle, and wrestled. The winner of this match ran to the opposing side's karkoo, lifted the stick and hit the karkoo on its supposed head, then returned to his side. The loser dropped out of the game. The winners were the side who last held the field.

Fighting.—Their offensive weapons consisted of spears, throwing sticks, nulla-nullas (used as clubs for throwing), boomerangs, and stone tomahawks. The boomerang and nulla-nulla were made from any hard wood, mostly ironwood, by cutting with stone tomahawks, and were polished with the rough fig-tree leaf. These tribes were not very skilful at throwing boomerangs, depending on their spears and nullas when fighting.

One type of war-spear was made of ironwood, tipped with soft wood at the throwing end and bound with beeswax or cypress, pine gum and sinew. It had a barb of ironwood bound on with sinews The other type of war-spear, instead of a hardwood barb, had a number of pieces of quartz imbedded in beeswax, cypress pine gum, or grass-tree gum.

All spears had a small notch in the throwing end for the throwing stick. This notch was also bound with sinew. The fish-spear, up to 6 ft. long, was made with four prongs of hardwood each 1 ft. long, bound with sinews and sometimes barbed.

In the making of these war-spears the proportion of hard and soft wood varied. In some the hard wood was slightly less than half the total length of the spear (kulka) In others there was only about a foot of soft wood (marnoo). The latter were considered the better spears. The wax on a finished spear was always brightly polished with saliva and the leaf of the pandanus tree. A peculiar point in the making of these spears was that the man used the thick skin of his heel as a chopping block while shaping spears with tomahawk or shell.

The tomahawks were made of very hard stone ground to a sharp edge and fashioned to a blunt point at the back. The head was fastened to a split handle with sinews. The throwing stick was made from flat ironwood about 1 yd. long by 2½ in. broad at the widest part. It tapered only slightly. The handle consisted of beeswax or gum, often covered with a pair of polished mussel-shells secured with sinews. Sometimes the handle was made of a piece of pliant bush timber filled in with gum and fastened with sinews. The opposite end had a small piece of stick bound on by sinew at an acute angle, through a hole in the throwing stick. This stick ended in a knob to which the notch on the spear was fitted.' The throwing stick was often used as a weapon of offence.

The shield was known to the Wakooras, but they made very little use of it. Their weapon of defence was a throwing stick, and they could almost invariably glance the spear in flight, breaking the softwood part. They had no wooden sword, and their weapons were not carved or inlaid with shell of any kind.

These tribes were warlike and were often fighting among themselves and with neighbouring tribes. About 1893 a tribe of Mitchell River natives known as the Kooka-minnies raided the Hodgkinson Valley. The combined Wakoora, Chunkunberry, and Wun-yurika tribes were outnumbered and stood no chance against the invaders. The Kooka-minnies took all the young women and the men were driven away. An interesting point is that the Kooka-minnies captured a Chinese garden belonging to a man called Min Fu and divided it up amongst themselves, giving a certain amount of garden to each person. The whites of Woodville, numbering about twenty, attacked them at night and dispersed them with rifles. The local natives on their return found their gins in the camps vacated by the Kooka-minnies, many of them tied up.

When the men fought they were always armed with spears, unless it was the outcome of a sudden quarrel, when the nearest weapon would be used. Fights were often arranged days before they eventuated. When this was the case the fight was preceded by a great amount of talking, spitting, swearing, and other display. This was often as far as it got; but if affairs ended in a fight they would separate about 50 yds. and throw spears at each other. Usually no damage resulted, spears being parried with the throwing stick.

When the men were fighting, there would always be several old gins dancing, with constant singing and swearing, around and between the combatants, carrying the yam-sticks which they invariably had with them. The gins were never hurt, though it is hard to understand how they escaped injury.

The gins often fought savagely among themselves, and their method was this: They would stand apart, armed with their yam-sticks (a wooden club about 4 ft. long and 1½ in. wide, and with blunt-pointed ends), spitting and swearing at each other, biting the yam-stick and hitting it on the ground. They would gradually close on each other and put up a battle reminiscent of the quarter-staff bouts of "Ivanhoe." Although the gins were pugnacious among themselves and often fought more savagely than the bucks, they allowed their husbands to beat them without opposition.

Arts.—Painting and the arts in general were practically non-existent. The only drawings I have seen wrought by these natives were crude pictures of goannas. They were fond of making the tracks of birds and animals in the soft sand. At the present time, the natives have acquired some skill in carving and painting, but this is a modern innovation.

Puberty.—Amongst the girls puberty had no tribal significance beyond that they then became marriageable. Amongst the boys, sometimes before puberty, the penis was tied backwards over a roll of tea-tree bark. The effect of this was to give the organ a distinct bend downwards. While undergoing this process the boys were very self-conscious and shy. We might note here that masturbation was exceedingly common among both men and women. At puberty the ceremonies were—

(*a*) Knocking out the upper right central incisor.

(*b*) Piercing the septum-nasi.

(*c*) For boys only—drinking of some of his father's blood; or if the father were dead the blood of the nearest male relative. The boys were thereby fitted to grow into strong men.

(*d*) Among the girls the hymen was ruptured with the finger.

Devils, Doctors, and Burials.—These natives were highly superstitious and had an intense fear of devils. There were four of these—

(1) The Beerroo, who lived anywhere.

(2) The Eekoo (or mountain devil), who lived on Mount Mulligan.

(3, 4) Mooramully, Barmboo—Water devils inhabiting waterholes.

Most sickness was attributed to the agency of these devils, the blame generally falling on the Beerroo or the Eekoo These devils were able to throw hooks, stones, or pieces of wood into the body without leaving a mark. The Eekoo's home was a lake on Mount Mulligan (Lake Koongirra), and natives were very afraid to go near this lake or into its waters; though the Rhoonyoo (or witch doctor), being a companion of the Eekoo, could enter the water without fear The Eekoo was generally held responsible for any sickness when on the mountain. The natives have an interesting legend to account for the origin of Mount Mulligan and its lake. The mountain, which was built by the wallabies on the advice of the eaglehawk, was originally a huge pile of stones. A swamp pheasant built its nest on the mountain and hatched its young. The Eekoo came along and killed the nestlings. The pheasants in their anger thereupon started a bush fire to burn the Eekoo, and so great was this conflagration that it melted the stones and so formed the towering cliffs of Mount Mulligan. To save his life the Eekoo created the lake and took refuge in its waters; and so the lake became his home. Although the lake is the home of the Eekoo, strictly speaking he is not a water devil but wanders about anywhere on the mountain. Some of the old natives declare that they saw the Eekoo sitting on trees around the mine a few days before the great Mount Mulligan colliery explosion in 1921. They say he blew up the mine in anger at the white man's intrusion on his domain. They firmly believe that he will again blow up the mine.

The Mooramully and Barmboo lived in the waterholes, and were responsible for deaths by drowning or sickness coming on shortly after a swim. All these natives were excellent swimmers. If a native were caught in quicksands he declared that the Mooramully had pulled him under. The booming noise made by ripples against a washed-out bank was the voice of the Barmboo. The Mooramully was an important spirit, since he not only initiated the Rhoonyoo or witch doctor, but also kept him supplied with knowledge and worked for him. When the rainbow came out, this was the Barmboo himself. If it shone on a native (other than the Rhoonyoo) he would die.

It was a common occurrence for either the Beerroo or the Eekoo to carry off a gin or a man and deal with them as previously described. The natives used to mark trees and hang up pieces of bone to frighten these two devils away. The devil was supposed to see these and depart satisfied.

Superstitions.—They had many superstitions about animals and birds. If a swamp pheasant flew near them they feared their hair and whiskers would grow long. The wagtail was the Beerroo himself; they did not like this friendly little bird to come near them. The channel-bill was supposed to make the penis grow long and, to use a simile, like that of a horse, and the vagina capacious. I have keen recollections of small aborigines thirty years ago quickly covering their persons when the scream of this bird was heard. The dollar bird was the controller of the mussels, shifting them from place to place in the river. He did this work in the night. The bat was responsible for all grey hairs. The shaky-paw lizard was not to be held up by the tail. This would cause the heavens to fall. The bush cockroach was supposed to squirt urine into the eyes and cause total blindness, and death shortly after. Kangaroos suffered a great deal from this insect. The jacky-winter bird controlled the sun, and was responsible for hot days.

Witch Doctors.—Each tribe had its witch doctor or Rhoonyoo, who was the most important man in the tribe. He was generally the most cunning and strongest man of the tribe, since he appointed himself. On the death of the Rhoonyoo, the most cunning man of the tribe would go away for a day or two and on his return say that he had been made Rhoonyoo by the Mooramully. He declared that he was carried off by the Mooramully to his favourite waterhole and lived with the Mooramully in sodomy for some days. The Mooramully then killed the prospective Rhoonyoo by sticking long, thin, sharp pieces of wood through his body. The Mooramully then restored the candidate to life by pulling the pieces out of his eye. The candidate, on his return to life, put the Mooramully through the same performance, and was fully qualified. He then returned to his tribe and was acclaimed Rhoonyoo, which means "thunder." His functions were to cure diseases and control the weather. He cured diseases in the usual way by removing the hooks, sticks, or stones thrown into the patient by the devils. This sleight of hand work was done very cleverly. He also frequently treated disease by bleeding. He could bring the wind and rain at will. His failures were always excused by saying that several Rhoonyoos of other tribes had conspired against him, and their combined efforts were more than he could combat. The natives were afraid of the Rhoonyoo, as he could sing them dead, send poison by the wind, or cause them to shrivel up and die. In fact he could kill them by any method he pleased. The members of the tribe had to supply him with food. Although powerful he was not chief of the tribe. This function was performed by the best fighter. Any member of the tribe was supposed to have the power to sing another person dead. Deaths in the tribe were often attributed to members of other tribes hundreds of miles away. Bone or stick pointing was not practised by this tribe.

The Rhoonyoo often displays great imagination in his stories. One Rhoonyoo declared that there were big bark tanks in the heavens which he kept filled, and from which the rain fell. The dry weather was caused by a big bull that lived on antbed and thus got very thirsty. This bull by drinking up the water supply caused a drought. This is a modern tale told to me by Chower-ee-pa, the present Wakoora Rhoonyoo.

Singing.—They were energetic and frequent but not tuneful singers. Many of their songs were impromptu, especially the corroboree songs. Some were standardised and well known. Of these standardised songs, some had meanings—e.g., about trees, love, &c.—and some were a meaningless jumble of sound. The Rhoonyoo had special songs to bring rain and wind; the gins had theirs to drive it away. A mournful dirge was kept up for days when a death occurred, and also at the unexpected arrival of a near relative after a long absence.

Burials.—After a death all the gins would wail for days, and some of the older gins would roll their hair into little balls with wax; the camp was always shifted. The dead were either mummified or buried. The mummification was done by rolling the body full length in tea-tree bark and binding tightly with string. This was left in the sun and carried from camp to camp, sometimes for years. Very few bodies were treated in this manner, the majority being buried. They had no fixed burial ground; each corpse was buried in a different spot, and well away from the others. As soon as death took place, the naked body without ornaments was tied up with string made from the pandanus tree. The knees were pressed well into the chest, elbows by the sides, and the hands extended along the cheeks. The body was tightly wrapped in tea-tree bark, and buried about 4 ft. deep. The body was placed in the grave on its left side facing the west. A fire was also lit on the west side, in the belief that the devil, on emerging from the grave, would be burnt in the flames.

The natives never referred to a member of the tribe after his death. The mention of a dead person would often make the gins cry.

LANGUAGE.

The language is simple in the extreme. The vocabulary comprises about 800 words. Great irregularity marks their grammar and syntax. The same word acts as noun, verb, adjective, &c., without alteration; and there are no tenses, cases, &c., or any inflections. About the only rules of syntax are that a pronoun or noun generally begins a sentence, and a verb ends it; and adjectives follow the nouns they qualify. Reduplication was used very freely, for emphasis. A suffix "-jee" is often added to words, but has no meaning. Words are often clipped short in speaking—e.g., "bunna nooka" for "bunna nukarnga," "poopair" for "poopeelungun."

Vocabulary.—The following words comprise almost the whole vocabulary. Words are written as pronounced. The composite guttural sound of "n" and "g" is printed in italics; where "ng" is printed in ordinary type it is pronounced as two letters :—

Kúrr*ng*un = Hard
Pútchee = Sore; also a hole in a tree
Chóoma = By-and-by
Bútta = Down
Góorin góorin = Crooked
Chárrpa = Boggy
Bínna-kúrrajee = Deaf
Mínnee = Good
Chányee = Bad
Kúlmba = Sweet
Winkurrajee = Hungry
Wówoo = Thirsty
Kúlparlee = Long or big
Kapoo = Stinking
Dínc ha mutchun, Dar*ng*oo-galláh = Bald-headed
Nyóopun = One
Múmmarra = Two
Kóorchoo = Three
Yálla = Close
Kóolee = Angry; or a louse or flea
Kumba, Kúrrpar = White
*Ng*óompun-*ng*óompun = Black
Bí*ng*arjee = Grey
Kóotchee, Marróon = Red
Yámma-dámma-doo, Yámma-doo = Up, or the sky
Kóonk-arr = North
Núcka = East
Kóoa = West
Chérparr = South
Chóomoo = Short
Bóoya = To pass flatus
Wanchámba = Where
Yálla, Yárra = There or here
Yállanya = This or that
Kármpoor, Búnkar = Raw
Wápparlee = Four
*Ng*ármootchee = Plenty (above four)
Chappa-chappa, Chár*ng*oorr, Kúlparlee = Big
Póopeelungun, Poopin = Little
Wóolair, Wóolun = Dead
Chílpa = Very fast
Chéerily = Very hairy
Kútchaga = With great exertion
Dúmma-dúmma = To go in and out
Núnka-núnka = Early in the morning
Wóorrmpa = (To sleep) soundly
Chóomoo = Short
Párnpardee = To cry
Chúnkee, Mullbíndamulla = To climb
Wándeela = To pick up, get up, lift
Muncénee = To bring
*Ny*ama-*ny*áma = To understand
Wachóojoo = To burn
Wóonchoo-wachóojoo = To make a fire
Búnna nookárnga = To drink
Noo-kárnga = To eat
Kútta = Come
Umba = Come on
Tóo*ng*un = To go
Móokarr = To cut marks
Múnkun-múnkajee, Múnka-múnka = To play
Bóotcha = To repeat
Kóonchoo = To bend a joint of the body
Móonka-*ny*úntarnda = To cut hair
Kingkínakin, Chóonchoolee = To pretend
Párrpan-párrpan, Káoo-káoo = Yellow
Yállmarr, Nagóoroo = Blue
*Ng*éikooloo = Green
Yoikói, Yóorra, Yúkka = Look here! an exclamation to call attention
Woi = Hullo! in answer to a call
Bíndarlee = Sweating freely
Yínkarn = Very thin
Bóolka = Hurrah
Muh = Interjection indicating surprise and satisfaction
Yukkóoey =, Interjection indicating satisfaction
Owa = Tommyrot (interjection)
Wandíndy = To stand

Múnka = To laugh
Kú*ng*ya = To dig
***Ny*únta** = To cover up
Charrkúnda = To run
Kúrra = To dive
Mirrinjee, Mirree = To break
Tóo*ng*ada = To walk
Netchéenjee = To see
Wóomee = To smell
Chárrpee = To swim
Nyóompoo = To spit
Bóorka-bóorka = Venereal disease
Yálkaga = To sing
Poondúnda = To stop
Bulkárga = To say
Pútchee-wandindy = To develop a sore
Wattárda = To swear
Itcharing = To put or place
Wóonana = To sleep
Wállancha, Wállanchalla = To throw
Bóoimunjee, Bóoimair = To hit or to fight
Muneenee = To bring
Kúll*ng*a = Uncle
***Ng*útchee** = Grandfather
Kúmmee = Grandmother
Bimmair = Aunt
***Ng*únchun** = Father
***Ng*ármoo** = Mother
Púpparr = Sister
***Ng*óochoor** = Cousin
Yáppa = Brother
Yáppa-choo = Young brother
Bóogoojee = Old man
Wárroo = Young man
Méekooloo = White man
Kárkoo = Baby
Chámpeer = Child
Dútcharr = Boy
Girra = Girl
Kúngamulka = River
Bóotchee = Plain or flat country
Bármboo = Rainbow or water-devil or earthworm
Chápoo = Dust
Kúppee = Urine
Chátcha, Chambútchee = Fæces
Bóorrkair = Semen
Chíloo = Sweat
Márnoo = Throat
Búnna-charkúnda = Running stream
Wóonchoo = Fire
Wóonchoo-kóonkin = Firestick
Bikarnga = To bite
Nookárnga = To eat

Dinkarnga = To catch hold of
Márnoo-dóo*ng*a-dóo*ng*a, Kúlchin-kulchy = To vomit
Yámpa = Hut, home, or camp
Kúbba-kúbba = Corroboree
Kóorrma = Native oven
Myee = Food
Wápparr = Shade
Kóol*ng*arr = Dilly-bag (woman's)
***Ng*óo*ny*in** = Dilly-bag (man's)
Klápam = Tea-tree bark torch
Pítchee = Tail
Kóonkun = Club
Yárrmoo = Yam-stick
Yirrimba = Fish-spear
Kucka = Sick, or tobacco
Kulka = Spear
Móorunga, Bútcha-bóokal = Long war-spear
Koóeeyun = Quartz-spear
Rúmun = Throwing stick
Wú*ng*ee = Boomerang
Warrpee = Tomahawk
Yóomparrajee = Stone tomahawk
Kúlmba = Honey or small native bees' nest
Móorungun = Large native bees' nest
Wóonpa = English bees' nest
***Ng*óokoo** = Bees' wax
Yeéparr = Sinews
Kúrrkair = Water vessel
Wóonga-wandindy = Morning
Eélei-élee = Evening
Pítchoor = Dark
Mú*ngy*-mú*ngy* = Day
Wápparr = Shade
Múrra = Hand
Dár*ng*oo = Head
Méeralee = Eye
Dirra = Teeth
Márnoo = Throat
Chíppa = Liver
Boónoo = Buttocks
Yinkun = Pectoral muscle in front of axilla
Dútcharlee = Heart
Chóorpoo = Bowels
Chóolpee = Small intestine
Boórroo = Belly
Núnchun = Collar-bone
Boórroojee, Kárkoonjee = Pregnant
Moónkoo-charkúnda = Abortion
Chátcha-boórrpoor = Diarrhœa
Chímar = Antbed
Kílmary = Ashes
Wóorpa = Fog
***Ny*ínchar** = Sound

Mínya = Meat
Búnna-bóoleen = Waterfall
Chill*ng*arr = Shell ornaments
Dúnkee = Gully
Bóonchooroo = Swelling in skin
Bárchoo, Kóonkin = Stick
*Ny*óompoo = Saliva
Boónkoo = Knee
Móorrmoon = Maggot
Waárring = Husband
Galláh = Circumcision
Meémee = Breasts
Bóorroo = Abdomen
*Ny*ápee = Tongue
Wállarr = Beard
Bínna = Ear
Chówa, Kár*ng*koo = Mouth
Móo*ng*ka = Hair
Máppoo, Kílmpee = Womb
Chíppee = Vagina
Chírry = Pubic hair
Kóornkoo = Hymen
Chóonkoon = Labia vulvæ
Chárra, Boókoo = Penis
Dóonkoon, Tarlan - Glans penis
Koóra = Testes
Choombármpa, Choombúnka = Coitus
Mírry-dúmma-dúmma = Masturbation
Toómbarinka — To take away virginity
Chóolma = Sand
Wányoori*ng*ada = What are you doing ? or why ?
Jírry = Clouds
Yeérpee = Whistle
Yeékoorr = Spring of water
Mákirra = White clay
Yóolmpoo = Big mountain
Bóotcheer = Big patch of sand
Yímpee = Lips
Chátta = Thigh
Kúpparee = Armpit
Dóompoo = Boots*
Kúllman = Sexual maniac
Wárloo = Face
Póopair-yoópar, Kúppeer-kúppeer, Yárrka-yárrka = Lot of little children together
Kúrra = Sound like a whip cracking
Móonyoólee = Running nose or cold in the head
Déewun = Scrub turkey
Wóormboo = Plain turkey
Chóonking = Flying fox
Kóoladoo = Dove
Wárrkoongoo = Dollar bird (roller)
Kátchirry = Grey jumper
Jarkooer = Leatherhead (friar-bird)
*Ng*ár*ng*koo-*ng*ár*ng*koo = Twelve apostles (babbler)
Chóoreear = Bower-bird
Chíllchoor = Fish eagle
Chínna-pítchoo, Chínna-márlkoo = Sparrow-hawk (goshawk)
Yálpun = Stormbird (channel-bill)
Kulmbú*ng*arr = Shag
Pírr-pírr = Blue Mountain lorrikeet
Mállee = Bat
Kóoyoo-bugga = Gigantic crane
Búngarr = Blue crane
Chéewoorba = Swamp pheasant
Réwa = Duck in general
Kóotantoo = Rosella parrot
Míllun-millun = Tree-creeper
Jeérfeer = Large honey-eater
Koótchoorlee-bírry-bírry = Bee-bird
*Ng*úrrkee = Night-owl
Múrrar = Feathers
Míttee = Leech or tick
Mooya-moo = Ant
Tow-w = Sound of rifle shot
Wair = Exclamation meaning "I don't know"
Chílloor = Wild goose
Túpparr = Squatter pigeon
Lármpa-larmpa = Bronzewing pigeon
Kookóocheedee = Wampu pigeon
Wakóoka = Jackass
Bóornkin = Black cockatoo
Géeaja = White cockatoo
Pyee-pyee = Magpie
Dítceritchen = Wagtail
Dóonoree = Wedgetail eaglehawk
Boórkoor — Kite
Kuránjee, Bányan = Emu
Kóorchar = Native companion
Tú*ng*arr = Ibis
Wátchar = Crow
Bíllawarra = Pelican
Tár*ng*oon = Bird in general
*Ng*óorkoo = Mopoke
*Ng*illy-*ng*illy = Black duck
Chee-wiggey = Whistling duck
Dúrrnchar = Egg
*Ny*óorpoo = Butcher-bird
Wóonga = Jacky-winter
Móonya = Honey-eater
Kúmmair = Fly
Pítchin, Chím[illegible]o = Grasshopper
Bítchin = March fly
Kóorain, Chámpoon, Koóloongoor = Large tree-grub.

Móokotóomboo = Water spider
Pitchee-cúmparrjee, Bittoon = Ringtailed 'possum
Wóoroo-rhóomboo = Black snake
Múllkúnneymoo = Brown snake
Tóopa = Death adder
Yeékurra*ng*un = Black prickly-backed water-snake
Rówa wungíriga = Freshwater crocodile
Múnkair = Frill lizard
Bóolmbaroo, Bóolcha-bóotcha, *Ng*óolamagoo = Sleepy lizard
Choolmbárnoo = Large plain kangaroo
Wárrajee = Wallaroo
Kúntama = Pretty-face wallaby
Bówoor = Rock wallaby
Wálkooree = Kangaroo rat
Chàll*ng*ar = Bushtail rat
Wyka = Native cat
*Ng*ú*ng*kin = Porcupine
Toórka = Bandicoot
Toómpoo-tóompoo = Stag beetle
*Ng*ástilalum = Green water-snake
Kulpówoorr = Cypress pine
Myra-myra = Ironwood tree
Mútchula = Branch of tree
Qúinkun = River fig-tree
Chátama = Rough-leaved fig-tree
Chàll*ng*arr-chátchoor = Pandanus tree
Rúngoon = Pandanus fruit
Koópoorr-kóopoorr = Quinine tree
Boóncha-booncha = Mosquito
Moolóoachar = Ant-lion
Woónchurúngun = Bush cockroach
Káiya = Sand cricket
Yów-wa = 'Possum
Chálpun = Carpet snake
Yínboonboo = Black water-snake
Búrrcharjee = Tarpot (black-headed python)
Díckarr = Snake in general
Woórnka = Goanna
Chúnkalunkun = Shaky-paw lizard
Kíya = Dog
Woonbóongoo = Water-rat
Bóoree = Track of foot
Jóolabirry = Whip-snake
*Ng*átchalum = Blind snake
Kínyeegar = Bandy-bandy snake
Wóowarl, Chárrpar = Green water-snake
Bóorpoor = Lance-headed lizard
Móorum = Dingo
Chóorree-chóorree = Yellow water-goanna
Bóorama = Black water-goanna
Chámba = Turtle
Dárree, Tálnkarr = Box-tree
Kárngooparbal = Leichhardt tree
*Ng*óoyoolee = Burdekin plum
Bírrar = Leaves of bushes
Károola, Wárraboolka = Large bitter yam
Wámmoon = Long thin yam
Múnnarr = Currajong
Kóora-ace = Currajong fruit
Kówarr = Bloodwood, or to shout out
Kárrboo = Ebony tree
Pilchirry = Tree, growing in watercourses, which has long thin upright branches
Queéka = White currant growing in rivers
Bóokun = Grass in general
Bányan-bányan = Wild peach-tree
Dítchin = Dead bark of ironbark
Yéela-yéela = Wild hops
Dutchárnjee = Wild grape
Tálmanjee = Wild pomegranate
Chárrkun = Gum-tree resembling ironbark
Wárlchoo, Chárakun = River gum-tree
Yáy-yam = Catfish
Wáttar = Black bream
Dárlkoo = Archer (spotted bream)
Kóorkin = Guard-fish
Woolpérra*ng*un = Rock cod
Woókajoo = Large shrimp
*Ng*árrankuljee = Finger-mark fish
Bínyee = Periwinkle
Jínna = Foot
Kárrkoon = Blood
Wúngalungun = Fat
Kítcha = Moon
Yírrmbee = Light
Wóolpun = Heat
Bóora = Ground
Koópoor, Boórair, *Ng*ároo = Smoke
Málmair = Lightning
Kóoyun = Hail
Kóonkin = Wood
Yeéga = Yes
Bárloo = I won't
Rúkka = Tree for poisoning fish
Yállnkarr = Wattle
Pórla = Firefly
Wállabooroo, Wárrka = Cork-tree
Noórka = Ironbark wood
Kóoragun = Ironbark tree
Múrraba = Broad-leaf tea-tree
Doórncha = Grass-tree
Chíchoo = Narrow-leaf tea-tree
Bóykoo = River tea-tree
Koóyoo = Fish
Muníaka = Small jewfish
Chúnkun = Large jew

Pínyoor = Perch
Kárrojee = Bony bream
Boólcha = Mud cod
Koóndy = Mussel
Woólerajin = Leather-jacket
Woómoo = Nose
Dárree = Bone
Yárlpun = Skin
Woónga = Sun
Mútta = Star
Wákaree = Cold
*Ng*oókoo = Water
Chúnka = Stone
Quí*nga* = Wind
Rhóonyoo = Thunder
Búnna = Rain
Múncha = Hill, or appetite satiated
Beéroo = Devil
Kúrree = No
*Ng*eíkoo = Me
*Ng*eíyoo = I
Yóontoo = You
Níckoo = To-day
Mímmee = Milk
Boó*ng*arr = Flowers
Chá*ng*ar, Dáincha = Dry
Kúckajee = Sickness
Kárkoo, Moóroon = Fingers or toes
*Ng*árra or *Ng*áree = Back of hand
Moótchun = Wrist
Choóroo = elbow
Yíncarn = Rib
Beépa = Leg (ankle to knee)
Woóloo = Ankle
Doónkoo = Back of neck
Toómoo = Lung
Goómpoo = Bladder
Bínna-too*ng*un = To forget
Día = To give
Chínken-chínkarjee = To play about
Wóokalooka = Liar
*Ng*árlee = Us
Kúnparrgo = Yesterday, or past time
Chóoma = Future time
Núnkarrba = To-morrow
Múnyarra = Wife
Choówun = Flood water
Cheérpun = Wet
*Ng*árkoo = Palm of hand
*Ng*ármoo = Thumb or big toe
Chícker = Elbow to wrist
Bínta = Shoulder to elbow
Moórrey-móorrey = To tickle
Chátta = Thigh
Boónkoo = Knee
Woórpar, Boórrkoin = Brain
Chákar = Shoulder
Woóra = Kidney
Meélkoor = Finger-nails
Kóolperra *ng*únda, Kóolparnda = Well done !

The following are a few names of natives :—

MEN.

Choweryeepa
*Ng*armoo-gooly-gooly
Chooragoorum
Mooyamoo
*Ng*armoo-yeeranda

(These were all "Rhoonyoos" or witch doctors. The word "*Ng*armoo" at the beginning of a name means that the person is the son or daughter of the person who held the latter end of the name, "ngarmoo" meaning "mother.")

Wowmitchoo
Marrkoo
*Ng*armoo-kooboora
*Ng*armoo-bupoon
*Ng*armoo-goonyooree
Munga

(Munga was king of the Wakooras when the whites first came to the Hodgkinson.)

*Ng*armoo-yooboonboo
Opee

WOMEN.

Chinna-goorin ("crooked-foot")
Munga-charnyee ("mouth-wounded")
Chamba-chambutchee ("turtle-dropping")
Kootchoorlee
Katcha
*Ng*armoo-tarpengoon
Warr*ng*unda

Sentences.—The following are a few sentences strung together as the natives would say them :—

Yoontoo wunyooringada woke-arrambarmba = What the devil are you doing ?

Yoontoo wanchamba too*ng*un = Where are you going ?
(you) (where) (go)

Yoikoi ! Rhoonyoojee ! Yoontoo nunkurraba bunna-walincha ?
(hello) (doctor) (you) (to morrow) (rain) (throw)

Hello, doctor, will you make rain to morrow ?

Booliman kutta *ng*arlee booimunjee chilpa charkunda
(policeman) (come) (us) (hit) (very fast) (run)

The policeman is coming to hit (or shoot) us ; run quickly

Bumma warnchoo yoontoo booimair ? — Who hit you ?
(man) (which) (you) (hit)

*Ng*eiyoo wailoo kurree necheenjee — I don't know who he was
(I) (face) (no) (see)

or the word "Waai" expresses exactly this meaning.

Yoontoo karnparrgo pitchoor pitchoor malmair necheenjee ?
(you) (yesterday) (dark) (lightning) (see)

Did you see the lightning last night ?

Choweryeepa Chillagoe too*ng*un —Choweryeepa has gone to Chillagoe

Wanyooringada yoontoo kumkum nukarnga ?—Why are you drinking beer ?
(why) (you) (beer) (drink)

Chanyee *ng*eikoo pappari woolair—I am sad because my sister died
(no good) (me) (sister) (dead)

Local Names—

Mulligan Creek—Mutchelum
Pinnacle south of Mitcheemitcheewarry—Boonboonchoorkoorgoo
McLeod Creek—Mooncharjee
Eastern Hodgkinson River—Choolkoor
Union Waterhole—Chookoochookoo
Waterhole below the Union Waterhole—Yoolboonboo.
Condle's Waterhole—*Ng*armoo chinkunda.
Darkie Green's Waterhole—Jimbajimba.
Walsh's Crossing—Chillagurra
Junction of the two Hodgkinsons—Jararngurra.
Waterhole near "Piggies"—Rootchoonagoo
"Piggies" Waterhole—Wowmurrakunda
Old Kurramoor Station Waterhole—Champi*ng*ago.
Waterhole at the junction of Waterford Creek and the Hodgkinson—Wooweewooweelarjago

Chinaman's Waterhole—Putcheerchootoo.
Mountain Waterhole—Meerkooroo.
Lily Waterhole—Bootcheerraga.
Yard Waterhole at south end of Mount Mulligan—Chincham.
Mulligan Creek Falls—Ditcharna.
Black Mountains at Deep Creek—Yoompoortookoor.
Pinnacle at Burrankamen—Warra.
Pride of the North Waterhole—Chilungarrba.
Waterhole above the Pride of the North—Burrankamen.
Black Mountain—Boondarimba.
Mount McCann—Kookaman.
Two-headed Pinnacle South-west of Black Mountain—Bannita.
Three Sisters Mountain—Wallanjirry.
Hodgkinson River—Kulkinnen.
Mitchell River—Dimbee.

Neighbouring Tribes.—The following are the names by which the surrounding tribes were known to the Wakooras :—

Chillagoe—Warkaman.
Mareeba—Moorlooratcheo.
Irvinebank—Choolngai.
Palmer River - Kookawarra.
Mossman —*Nq*arlkajee.
Dimbulah—Woombarmbarra.
Normanton—Kookaminnies.

NEW RECORDS OF CETACEA,

WITH A LIST OF QUEENSLAND SPECIES.

By Heber A. Longman, Director.

(Plate XLIII.)

PYGMY SPERM WHALE: Kogia breviceps (de Blainville).

In December, 1925, Mr. W. K. Cleeve, Secretary of the Rockhampton School of Arts, forwarded small photographs of a skull, which had been presented to the Museum in his charge. Recognising this as the rare *Kogia*, or pygmy sperm whale, I wrote asking if the skull itself could be sent in order that the specimen might be placed on record. Subsequently it was forwarded to Brisbane, on loan, for exact identification and description.

The skull was found under sandstone cliffs about five miles north of Corio Head, or approximately twenty miles north of Yeppoon, by Mr. George Corbett, who presented it to the Rockhampton School of Arts Museum. Unfortunately the material consists solely of the skull, which has evidently been exposed to the weather for a lengthy period and is much damaged and abraded. The anterior portion of the rostrum is incomplete. The lamelliform extensions of the maxillæ overlying the orbital region are broken away on each side, exposing the surface of the frontals. The vertex is incomplete, owing to abrasion, and the anterior portion of the mid-facial crest is now missing. The vomer is also damaged anteriorly. The orbital and palatal surfaces are much abraded, and no periotic bones are present. Notwithstanding the unsatisfactory condition of the skull, it has been thought advisable to put a few notes on record, but the specimen does not lend itself to significant illustration or detailed description. It is the first record of this rare Cetacean from the Queensland Coast.

No less than six species of the pygmy sperm whales have been described, three coming from Australasian waters. Under the name of *Euphysetes grayii* Wall, in 1851,[1] published a description of a skeleton found on Marouba Beach, Sydney, although the work is said to have been done by Macleay. In 1865 Krefft described *E. macleayii*, which was based on a specimen from Manly Beach,[2] and in 1873 Haast described *E. pottsii* from Governor's Bay, New Zealand.[3] Although considerable variation is presented by the crania and skeletal remains on which these species are based, the majority of systematists consider that there is but one wide-ranging species, *Kogia breviceps*, first described by de Blainville in 1838 as *Physeter breviceps*, the type locality being the Cape of Good Hope.[4]

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[1] W. S. Wall, Memoir No. 1, Australian Museum, Sydney, 1851.

[2] G. Krefft, Proc. Zool. Soc., 1865, p. 708.

[3] J. Haast, Proc. Zool. Soc., 1874, p. 260, and Trans. Pr. N.Z. Inst., vi., 1874, p. 97, pl. xv.

Oliver notes that twelve examples have been found on New Zealand coasts,[5] and Lord and Scott note a mandible in the Tasmanian Museum [6]

This incomplete Queensland skull has a maximum length of 395 mm.; the maximum breadth is 410 mm. (between the postorbital processes); and the height is 260 mm. (pterygoid margins to vertex). In the supraoccipital region there is a pronounced median concavity. From the posterior aspect it agrees fairly well with the cranium of *Kogia breviceps* as figured by van Beneden and Gervais (Plate XX., fig. 1*b*),[7] but the region of the vertex is more elevated. In this respect our cranium agrees with the specimens previously described from Australia and differs from the more flattened skull from Japan called *Physeter simus* by Owen,[8] which Beddard regards as a good species [9] The zygomatic processes are plainly visible beyond the exoccipitals on each side, from this aspect.

The mid-facial crest is formed, as usual, by the thickened posterior portion of the left maxilla, conjoined with the posterior extension of the right premaxilla. The last bone extends for almost the total length of the skull and apparently reaches in this Cetacean the relative maximum antero-posterior extent for the mammalia, illustrating to a remarkable degree the plasticity of the rostral elements.

It is true that in the Sirenia the massive premaxillæ of the dugong (containing extraordinary elongated incisors that are almost wholly hidden in most specimens) present an analogous development, but even here the anterior elements, although the dominant bones, do not extend so far back towards the occiput. In the perfect specimen of *K. breviceps* described by Benham, "triangular calcifications" carrying a tooth were noted at the tip of each premaxilla.[10]

There is no evidence of the frontals on the surface in the region of the vertex, and there are no distinguishable nasals. The left blow-hole, or external narial orifice, is oval, with the antero-posterior diameter 60 mm., and the transverse 40. The right orifice is almost circular and is relatively insignificant being only 15 mm. in diameter.

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[4] de Blainville, Ann. Anat. Phys., ii., 1838, p. 337.

[5] W. R. B. Oliver, New Zeal. Jr. Sci. Tech., v., 1922.

[6] Lord and Scott, Syn. Vert. Animals, Tasmania, 1924, p 280.

[7] van Beneden and P. Gervais, Ostéog. des Cétacés, 1868 1879.

[8] Owen, Trans. Zool. Soc., vi., 1869, p. 30.

[9] Beddard, A Book of Whales, 1900, p. 189.

[10] W. B. Benham, Proc. Zool. Soc., 1902, p. 55.

The basal view of the skull is too much abraded to yield much information for comparative value with other specimens. Although incomplete, the lower borders of the pterygoids are obviously inflected posterior to the tubal notches, as in the specimen described by Schulte (p. 374), in his valuable study of fœtal and adult skulls.[11]

Beddard notes (*loc. cit.*, p. 186) that "Kogia or Cogia, as it is variously spelt, is a 'barbarous' word said to be a Latinised form of 'codger.' But it might be a tribute to a Turk of the past named Cogia Effendi, who observed whales in the Mediterranean."

BEAKED WHALE: **Mesoplodon densirostris** (de Blainville)

A skull of this rare Cetacean was found at Yeppoon, near Rockhampton, and presented to the Queensland Museum by Dr. E. H. Beaman in March, 1924 (J. 4056). No mandibular remains were secured, and unfortunately the skull is somewhat damaged and abraded. This is the first record of this species for Queensland. The maximum length of our specimen is 720 mm. At a distance of 250 mm. from the tip of the rostrum, which is not quite complete, the height of the combined elements, which are well ankylosed, is 76 mm., whereas the width in this region is but 51 mm. Near to the anterior projection of the palatine bones, 50 mm. behind the previous region, the rostral is still more compressed laterally, but towards the apex the diameters are about equal. This gives concisely the chief characteristics of the massive rostrum. At the posterior end the mesorostral ossification rises above the premaxillaries in the median line. In front of the maxillary foramina the two deep characteristic grooves are present. Unfortunately the orbital region on each side is much damaged, and the ventral surface is considerably abraded. In general contours our specimen agrees well with the very fine illustrations of this species recently published by Sir Sidney Harmer, with detailed descriptions and references to literature[12]

Amongst other characters, *M. densirostris* is distinguished from a New Zealand species *M. bowdoini* Andrews,[13] which also has a very thick rostrum, by the absence of deep inner notches and the more posterior position of the antorbital notches at the base of the rostrum, the composition of the elements of the vertex, the narrower ventral surfaces of the pterygoids, and the curved lateral expansion of the rostrum in its central region, as seen from either dorsal or ventral views.

Krefft has recorded *M. densirostris* ("Dioplodon sechellensis") from Lord Howe Island,[14] and this appears to be the only specimen previously noted from Australasian waters. According to Sir Sidney Harmer (*loc. cit.*, p. 576) only seven examples were known in 1924 of this rare species. An illustration of the body contours, as drawn from nature, was published by R. C. Andrews in 1914.

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[11] H. V. W. Schulte, Bull. Amer. Mus. Nat. Hist., xxvii., 1917.

[12] S. F. Harmer, Proc. Zool. Soc., 1924, pp. 541-587, pl. i.-iv.

[13] Roy C. Andrews, Bull. Amer. Mus. Nat. Hist., xxiv., 1908, pp. 203-215, pl. xiii.

[14] G. Krefft, Proc. Zool. Soc., 1870, p. 426.

A NEW BEAKED WHALE: Mesoplodon pacificus new species.

(Plate XLIII)

An unusually large skull and mandible of a Beaked Whale found at Mackay in 1882 were presented to the Queensland Museum by Mr. E. W. Rawson. This material (J. 2106) represents a new species of *Mesoplodon* with a single pair of apical mandibular teeth, but which can be readily distinguished from both *M. hectori* and *mirus*. In several respects it resembles *M. mirus*, established by True in 1913,[15,16] more fully described and illustrated by Harmer in 1924,[17] and which is only known from three specimens obtained from the Atlantic.

The skull is nearly four feet in length, and judging from its size and the condition of the sutures it represents a fully mature whale. The specimen is in fairly good condition, but is somewhat abraded in places owing to exposure.

The chief characters of the new species are as follows —A single pair of apical mandibular teeth; symphysis more than one-fourth of the mandibular length No basirostral groove; rostrum very elongated, shallow, margined with a prominent flange. Maxillary ridges prominent and not diverging outwards. Maxillary foramina much enlarged. No inner notches present in antorbital region Lachrymal very strongly developed and forming the chief lateral constituent of the antorbital tubercle Region of vertex contracted towards the occipital elements, which are almost vertical; transverse diameter behind premaxillæ much exceeding antero-posterior length of vertex; nasals confined to anterior moiety of vertex

Mandible.—With the exception of the postero-inferior margins the mandible is perfect (Plate XLIII., fig. 3). No teeth are preserved, but there are two large alveoli at the apex of the jaw. These alveoli are 28 mm. in antero-posterior extent, with a width of 17 mm., and they are directed forward. The extreme tip of the mandible, just beyond the alveoli, is squarely truncated, but is very slightly abraded. A dentary groove, which is very straight, is present on each side of the anterior two-thirds of each ramus. The mandible is 1066 in length from the tip to the parallel of both condyles, or 1085 from the tip to the end of either condyle, and the symphyseal region extends for 300, or considerably more than one quarter noted for the type of *M. mirus*. In lateral contours and in the straight external border of the anterior portion the mandible agrees fairly well with the descriptions and

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[15] F. W. True, Smith. Misc. Coll., vol. 60, No. 25, 1913.

[16] F. W. True, Proc. U.S. Nat. Mus., vol. 45, 1913, pp. 651-657, pl. 52-57.

[17] S. F. Harmer, Proc. Zool. Soc., 1924, pp. 541-587.

figures of *M. mirus* published by True and Harmer, but the area between the condyle and the coronoid process is emarginated and the upper surface of the symphyseal region is concave.

The skull is 1186 mm. in maximum length, with a maximum breadth across the zygomatic processes of 520 mm., and the height from the inferior borders of the pterygoids to the vertex is 455 mm. In comparison with the skull of *M. hectori* as figured by Flower,[18] this species is much longer and shallower in the rostral region, and the post-rostral portion is relatively much broader. In the diagnostic characters of the antorbital region as set out by Harmer (1924), *M. pacificus* differs essentially from both *mirus* and *hectori* The anterior plate of the malar is greatly expanded and covers the entire ventral surface of the prominent antorbital notch, but, unlike *M. mirus*, it does not form part of the notch itself and is well hidden from the dorsal surface although just visible from the lateral view. The styliform zygomatic processes are broken on each side. The large and greatly thickened lachrymal is a very distinctive feature. It forms a prominent part of the tubercle when seen from either the dorsal or anterior view, and also is the main constituent in the lateral view. Its rounded lateral border slopes to the ventral surface, where the flattened portion passes inwards beneath the zygomatic process of the malar.

Compared with the lateral view of skulls of *mirus*, as illustrated by True and Harmer, the lachrymal of *pacificus* is strikingly distinct, its vertical thickness being no less than 46 mm., whilst its maximum antero-posterior extent is 55 mm. This is well shown in Plate XLIII., fig. 2. The antero-ventral border of the bone is rounded, whilst the posterior portion is obliquely triangular with the apex directed upwards and backwards. On each side of the skull this element is far thicker than the overlying frontal and maxillary plates (apart from the maxillary ridge), and in this lateral development the lachrymal appears to reach in *M. pacificus* its maximum in the Ziphiidæ.

When referring to the flattened lachrymal of a young *M. grayi*, W. K. Gregory, in his study of the evolution of this element, states, "In existing odontocetes the most complete and primitive condition of the lachrymal is seen in the Ziphiinæ."[19] *M. pacificus* would appear to be a specialised species in this respect, and in view of the different interpretations of the elements of the antorbital region of other Cetaceans, as noted by Owen, Flower, Harmer, and others, this development is of interest. The lachrymal in R. Kellogg's fossil dolphin, *Xenorophus*, is relatively enormous.

In *M. pacificus* the vertex has reached a more posterior position than in either *mirus* or *hectori*, and this is an outstanding difference which is obvious when the superior cranial surfaces of the three species are viewed together. When seen in lateral outline the occipital region of *M. pacificus* is much more vertical, and the distance from the border of the foramen magnum to the

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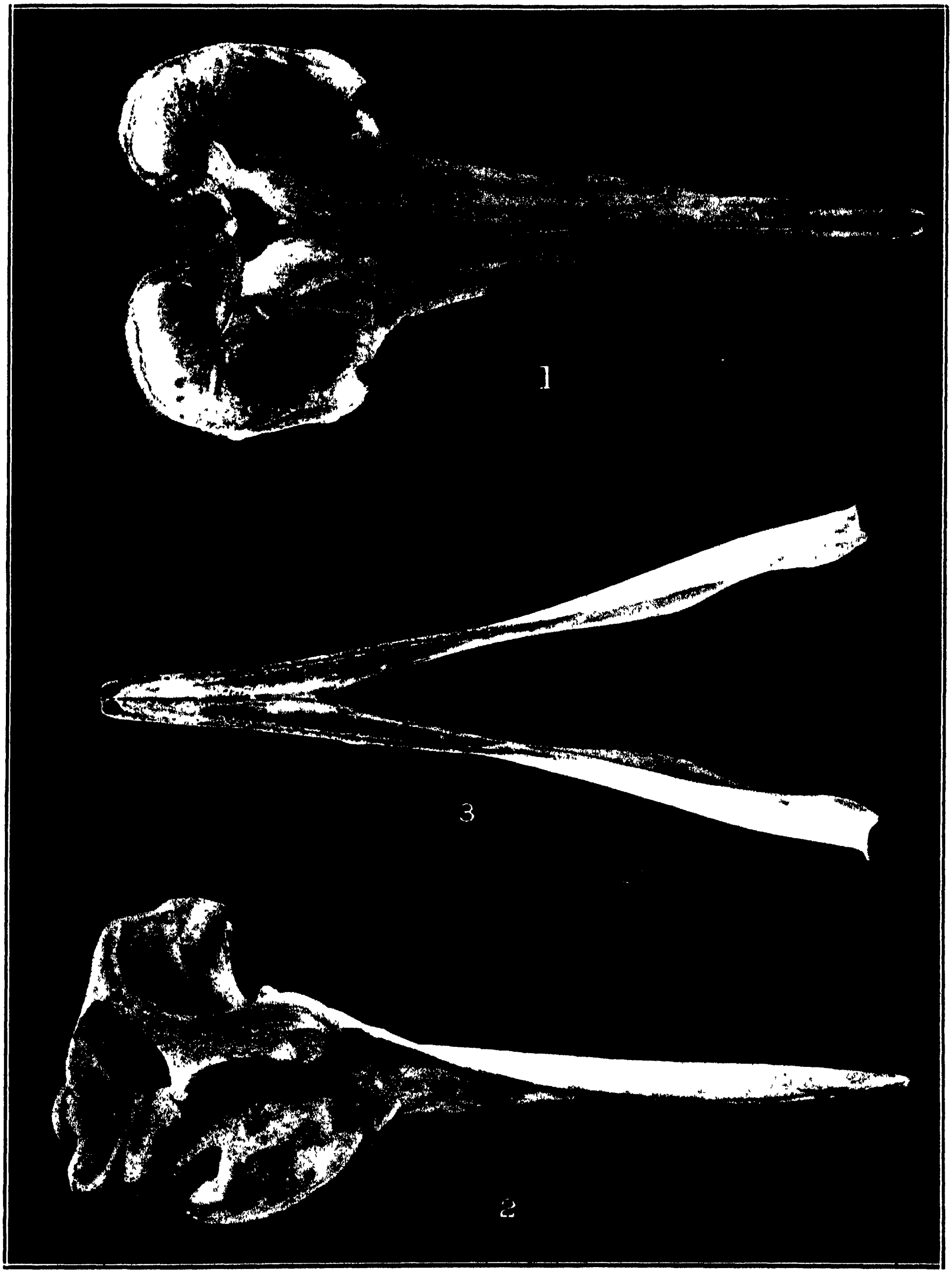
[18] W. H. Flower, Trans. Zool. Soc., x., 1878, pl. lxxi.

[19] W. K. Gregory, Bull. Amer. Mus Nat. Hist., xlii., 1920, p. 161.



Mesoplodon pacificus Longman.

W. Sanderson, Photo.

external narial orifices is relatively much contracted. The width of the expanded anterior portion of the vertex across the premaxillæ is about equal to half the width of the cranium in this region, as in *M. mirus*. The median portion of the nasals reaches the plane of the premaxillary plates. Owing to abrasion on the dorsum of the vertex, the sutures between the component parts cannot be fully traced, but the post-nasal elements are quite as extensive as the conjoined nasals. The right nasal is larger than the left. The width of the vertex behind the expanded premaxillary plates far exceeds its antero-posterior diameter, as may be seen from Plate XLIII., fig. 1, and this forms a striking distinction between *M. pacificus* and *M. mirus* and even more so with *M. hectori*. Behind the premaxillary crests the recurved plates of the maxillaries are vertical in position, but are thinner and less extensive outwardly than in *M. mirus*, as figured by Harmer.

The mesethmoid has a very prominent convex projection, attaining 50 mm. in height, at its junction with the mesorostral ossification immediately in front of the nares, and behind this is a deep vertical sinus, which is not found in *hectori*. In front of the nares the right premaxillary plate (72 mm.) is wider than the left (60), whilst at the expanded portions on the subvertical anterior face of the vertex the right plate attains 120 and the left 72.

The straight and prominent maxillary ridge is best developed on the right side, but this region is partly abraded on the left. This ridge is almost parallel with the median line of the skull, resembling that of *M. europæus*, and is not directed obliquely outwards as in *M. mirus*. From the lateral view its dorsal border is evenly convex, and in transverse section it is acuminate.

There is no noticeable inner notch but an even curve at the base of the rostrum in front of the prominent antorbital notch. The mesorostral ossification is confined to the basal portion of the rostrum and extends only 110 mm. beyond the line of the antorbital notches. The maxillary foramina are much enlarged (40 x 16 mm.), resembling those of *Berardius arnuxii*, whilst the premaxillary foramina, which are more anteriorly situated, are unequal in position, the left being considerably in advance of the other. The last-named foramina open into a groove in each premaxilla, which is deep but not extensive. In the median part of each lateral expansion of the vertex there is a prominent double foramen between the premaxillary and maxillary plates, These foramina open into the nares on either side of the mesethmoid.

The rostrum itself is relatively wider and less deep than that of either *M. mirus* or *hectori*, and in this respect resembles that of *M. bidens* as figured by True[19a] and by van Beneden and Gervais in "sowerbiensis." The maxillary flange on each side is a very prominent character. This commences in front of the maxillary ridge, and here for a short distance the outer edge is raised considerably above the level of the median portion of the rostrum. As it proceeds forward it slopes downwards until it ends on the ventral surface at the anterior point of the maxilla in the terminal fourth of the rostrum. The infero-lateral region of each flange is marked by a narrow dentary groove, which is also continued to the tip of the rostrum.

[19a] F. W. True, Bull. 73, U.S. Nat. Mus., 1910, pl. 7.

With the exception of the curved basal portion of the lateral flange, the rostrum is very straight on its superior border, when seen in lateral outline (Plate XLIII.). There is here a superficial resemblance to *M. grayi*, as figured by Flower and Hector, but it has no close affinity with this species.

On the ventral surface the vomer appears at 248 mm. from the apex of the rostrum. It is bordered by a longitudinal groove on each side and is also preceded by a median groove between the premaxillæ. The rostrum is very shallow in the region of the vomer. After being visible for 330 mm. the median element disappears beneath the thickening plates of the maxillæ. The pterygoid region is somewhat damaged and abraded. The sutures with the palatines cannot be traced positively between the anterior pterygoid wings

The basioccipital region resembles in its main features *M. mirus* as described by True and Harmer. The anterior halves of the ridges are strongly convergent and are continuous with the posterior lateral portions of the pterygoid. No periotic bones are preserved.

The anterior ends of the zygomatic processes of the squamosal are not so truncated as in *M. mirus*.

When compared with the illustrations of skulls of *Berardius* published by True (*loc. cit.*, 1910), C. A. Marelli[20] and earlier writers, it is obvious from the architecture of the vertex and other features that our specimen is a *Mesoplodon* and not an anomalous *Berardius* in which the second pair of teeth is missing.

Table of Measurements in Millimetres.

Skull, total length	1,186
Height, inferior borders of pterygoids to vertex	455
Width across zygomatic processes	520
Width across occipital condyles	160
Length of rostrum from level of bases of antorbital notches	815
Width of rostrum between bases of antorbital notches ..	335
Height of rostrum at middle	60
Width of rostrum at middle	160
Width of premaxillæ across expanded ends at vertex ..	241
Superior nares, greatest width	89
Mandible, length of ramus to end of condyle	1,085
Mandible, length of symphysis	300
Mandible, maximum height at coronoid	187

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[20] C. A Marelli, Annales del Mus. Hist. Nat. Buenos Aires, xxx., 1920, pp. 411-444, pl. i.-v.

The single apical pair of teeth is so distinctive a feature that Oliver has erected the genus *Paikea*[21] to accommodate *hectori* and *mirus*. Harmer, however, has pointed out the difficulties associated with this course, as *hectori* and *mirus* differ from each other in certain respects and the last-named is obviously allied to *M. europæus*, in which the teeth are near the posterior end of the symphysis.

Probably each new specimen to be received will add to our knowledge of the variation of these remarkable Cetaceans, which appear to be still undergoing a process of rapid evolution. The differences between *M. pacificus* and its allies, however, are too significant to be merely individual or due to age.

In his interesting review of the inter-relationships of the Cetacea, the late Herluf Winge (as translated by G. S. Miller) considers the short, broad cranium as the result of water pressure moulding the plastic elements, and the extreme development in the Xiphiines as due "to swifter, more violent swimming than other whales." Winge's views, which are here very condensed, are suggestive, and the extraordinary diversity of cranial architecture in this group is surely the result of such evolutionary processes. G. S. Miller (1923) has pointed out the probable significance of water pressure on the skulls of rapid-swimming mammals that are "born in the water."[21a]

Mesoplodon pacificus is extremely brachycerebric. An attempt to estimate the size of the cranial cavity, with inside calipers, shows an approximate length from the upper margin of the foramen magnum to the region of the degenerate cribriform plate (which is not perforated) of 155 mm., whilst the maximum breadth is about 260. There is a prominent vertical tentorial plate. The capacity of the brain case, as measured with fine sand, is 5,400 cubic centimetres. The minimum transverse diameter of the supra-occipital region to the margins of the temporal fossæ is 325.

Judging from the recorded proportions of other species, the skull of *M. pacificus* represents a beaked whale of at least 25 feet in length. It appears to be the largest skull yet recorded for the genus

LIST OF QUEENSLAND CETACEA.

The following species are represented in the Museum :—

MYSTACOCETI.

HUMP-BACK WHALE: Megaptera nodosa Bonnaterre (including *M. longimana* and *boops*).

The Queensland Museum is indebted to Mr. Thomas Welsby for the skeleton of a specimen about 35 feet in length, which was stranded on Stradbroke Island, to the east of Amity Point, in August, 1919. (J. 3343.)

SULPHUR-BOTTOM WHALE: Balænoptera musculus (Linnæus) (including *B. australis*).

Remains of skeleton without data.

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[21] W. R. B. Oliver, Proc. Zool. Soc., 1922, p. 574.

[21a] G. S. Miller, Smith. Misc. Coll. vol. 76, No. 5, 1923.

ODONTOCETI.

SPERM WHALE: **Physeter macrocephalus** Linnæus.

Apart from many teeth, the only specimen representing the Sperm Whale is an incomplete maxilla, collected at Bushy Islet, Hannibal Islands, N.Q., and presented by Captain T. M. Almond. (D. 8522.)

PYGMY SPERM WHALE: **Kogia breviceps** (de Blainville).

Recorded in this paper.

FAMILY ZIPHIIDÆ.

CUVIER'S BEAKED WHALE: **Ziphius cavirostris** Cuvier.

An incomplete skeleton of this whale was stranded at Nikenbah, near Maryborough, in 1918, and presented by Mr. Emil Jensen. It was placed on record by the writer in 1919.[22]

BEAKED WHALE: **Mesoplodon densirostris** (de Blainville).

Recorded in this paper.

LAYARD'S BEAKED WHALE: **Mesoplodon layardi** (Gray).

A skull and a few vertebræ were obtained from a specimen stranded at Zilzie, near Emu Park, Rockhampton, in 1884. (J. 2105.) A note regarding its identification by C. W. De Vis as *Mesoplodon layardi* was published by W. N. Jaggard in 1885.[23]

A specimen stranded near Southport, also in 1884, was tentatively recorded by De Vis as *Ziphius layardi*,[24] but no report on the skull and other bones appears to have been published. This whale was 12 ft. 4 in. in length, and was mounted with the skull in the Museum, where it is still on exhibition. In the circumstances, no satisfactory examination can be made of the hidden skull. No raised teeth can be traced in the mandible.

BEAKED WHALE: **Mesoplodon pacificus** Longman.

Recorded in this paper.

FAMILY DELPHINIDÆ.

PILOT-WHALE or "BLACKFISH": **Globicephala melæna** (Traill).

This species is represented by two crania, one of which (J. 3820) comes from Fraser Island (presented by Mr. N. D. Allom). Judging from crania alone, the "blackfish" stranded in Madura Strait, Java, recorded by K. W. Dammerman as Blyth's *G. indica*,[25] are closely allied to our species. I have preferred to use the specific name of the older species, which most authorities recognise as cosmopolitan, as I have no record of the colours of our specimen in life.

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[22] H. A. Longman, Proc. Roy. Soc. Qld., xxxi., 1919, pp. 90-93, pl. iii. and iv.

[23] W. N. Jaggard, Proc. Roy. Soc. Old., i., 1885, p. 58.

[24] C. W. De Vis, Proc. Roy. Soc. Qld., i., p. 174, pl. xix.

[25] K. W. Dammerman, Treubia, vol. v., 1924, pl. vi.-viii.

FALSE KILLER WHALE: Pseudorca crassidens Owen.

The late Mr. J. H. Stevens, Inspector of Fisheries, presented a skull with lower jaw of this Cetacean to the Museum in 1913. (J. 937.) The locality is stated to have been near Townsville, Queensland.

COMMON DOLPHIN: Delphinus delphis Linnæus.

This is represented by a skull with remains of the skeleton from Moreton Bay. (J. 2776.)

BOTTLE-NOSED DOLPHIN: Tursiops catalania (Gray).

This species is represented by several skulls, skeletal material and two mounted specimens. The localities range from Townsville in the north to Burleigh Heads. This appears to be the most common dolphin on our coast.

? OWEN'S DOLPHIN: Sotalia gadamu (Owen).

Two of our skulls have been identified as this species, which has been recorded for Australia by Flower[26] and Ogilby.[27] At present the writer is not satisfied with the separation of this material from *T. catalania*. There is considerable variation in the region of the pterygoids and according to True the number of teeth in *T. catalania* varies from 21 to 28. True also notes that the skull of *Sotalia gadamu* "shows decided affinities to *Tursiops*, from some species of which, were the pterygoids united, it would be very difficult to distinguish it."[28] In our specimens the antorbital region slopes obliquely away from the notch, and this appears to be a distinguishing feature from the type of *Delphinus gadamu* as figured by Owen.[29]

A skeleton of the Speckled Dolphin, *Sotalia lentiginosa*, is also present in the collections, and is probably from our waters but there is no locality data. This species, as figured by Lydekker,[30] is distinctively spotted when adult.

Coloured casts of models of species of *Balæna*, *Balænoptera*, *Megaptera*, and *Rhachianectes*, received in exchange from the American Museum of Natural History, New York, are on exhibition in the Public Galleries.

ABORIGINALS AND "PORPOISES."

In view of the references in literature to the supposed co-operative association in fishing in early days of Queensland Aboriginals with "porpoises," I have thought it of interest to review the observations on this curious subject.

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[26] W. H. Flower, Proc. Zool. Soc., 1883, p. 489.

[27] J. D. Ogilby, Catal. Austr. Mamm., Aust. Mus., 1892, p. 77.

[28] F. W. True, Bull. 36 U.S. Nat. Mus., 1889, p. 14.

[29] R. Owen, Trans. Zool. Soc., vi., 1869, pl. iv.

[30] R. Lydekker, Proc. Zool. Soc., 1908, pp. 802-808, pl. xlv.

The dolphins found on our coast are invariably called "porpoises," and presumably the species mentioned in the following references is *Tursiops catalania*. At the present time owing to the prevalence of motor boats these Cetaceans are less common in Moreton Bay than in the past.

As considerable scepticism naturally exists as to the reality of this co-operative association, several extracts will be given. In the Proceedings of the Zoological Society for 1856, p. 353-4, there appeared a short article by Mr. Fairholme entitled "The Blacks of Moreton Bay and the Porpoises," which is as follows :—

> "Between the two islands which form the south part of Moreton Bay, is a passage known as South Passage, formerly used for ships entering the Bay, but now given up. Near the deserted Pilot Station at Amity Point, some of the natives may constantly be found during the warmer months of the year fishing for 'mullet,' a very fine fish about the size of a mackerel. In this pursuit they are assisted in a most wonderful manner by the Porpoises It seems that from time immemorial a sort of understanding has existed between the blacks and the porpoises for their mutual advantage, and the former pretend to know all the porpoises about the spot, and even have names for them
>
> "The beach here consists of shelving sand, and near the shore are small hillocks of sand, on which the blacks sit, watching for the appearance of a shoal of mullet. Their nets, which are used by hand, and are stretched on a frame about 4 feet wide, lie ready on the beach. On seeing a shoal, several of the men run down, and with their spears make a peculiar splashing in the water. Whether the porpoises really understand this as a signal, or think it is the fish, it is difficult to determine, but the result is always the same : they at once come in towards the shore, driving the mullet before them. As they near the edge, a number of the blacks with spears and hand-nets quickly divide to the right and left, and dash into the water. The porpoises being outside the shoal, numbers of fish are secured before they can break away. In the scene of apparent confusion that takes place, the blacks and porpoises are seen splashing about close to each other. So fearless are the latter, that strangers, who have expressed doubts as to their tameness, have often been shown that they will take a fish from the end of a spear, when held to them.
>
> "For my own part I cannot doubt that the understanding is real, and that the natives know these porpoises, and that strange porpoises would not show so little fear of the natives. The oldest men of the tribe say that the same kind of fishing has always been carried on as long as they can remember.
>
> "Porpoises abound in the Bay, but in no other part do the natives fish with their assistance."

A somewhat similar account is given by George Watkins in the Proceedings of the Royal Society of Queensland, vol. viii., 1891, p. 45, who says: "The co-operative principle was so well understood between these fellow-adventurers, that an unsuccessful porpoise would swim backwards and forwards on the beach, until a friend from the shore waded out with a fish for him on the end of a spear."

Apparently the earliest record is that of James Backhouse, who states: "The blacks do not kill the porpoises because they show where there are fish to be caught." Mr. Thomas Welsby, to whom I am indebted for this reference, says that this was written on the 11th April, 1836, when Backhouse and his friends were at Amity Point. (J. Backhouse, "A Narrative of a Visit to the Australian Colonies," London, 1843, p. 368.)

Mr. Welsby also refers me to the account given by John Campbell, written first for the "Ipswich Observer," but printed as a pamphlet in 1875 under the title "The Early Settlement of Queensland and other Articles." The writer states that he was at first incredulous, but records his observations as an eye-witness at Amity Point, which are substantially the same as those given by Fairholme.

During the anchorage of the "Rattlesnake" off Moreton Island in 1847, John Macgillivray had an opportunity of making notes on the "Porpoise" of Moreton Bay. He refers to this as "an undescribed porpoise, a specimen of which, however, I did not procure, as the natives believed the most direful consequences would ensue from the destruction of one; and I considered the advantages resulting to science from the addition of a new species of *Phocœna*, would not have justified me in outraging their strongly expressed superstitious feelings on the subject. We observed that whenever a drove of these porpoises came close inshore, a party of natives followed them along the beach, and when a shoal of fish, endeavouring to avoid their natural enemies, approached within reach, the blacks rushed out into the water with loud cries, and, keeping their bag nets close together so as to form a semicircle, scooped out as many fish as came within reach." (Narrative Voyage Rattlesnake, i., 1892, p. 48.)

In "Tom Petrie's Reminiscences," dating from 1837 (published in Brisbane, 1904) his daughter records (p. 70) that one old porpoise was well known and spoken of fondly and the blacks regarded him as "the big fellow of he tribe of porpoises. I [Tom Petrie] have seen this creature take fish from a spear, and the white men working on the island told me that they often saw him knocking about with the blacks."

Another reference to this particular "porpoise" is to be found in "The Genesis of Queensland," by H. S. Russell, 1888, p. 290, where it is stated to be "as tame—with those blacks—as a pussy cat." Russell states that this scene was so curious "that the evidence of my own senses alone permits me to mention it." I am indebted to Dr. E. Sandford Jackson for the last two references.

Mr. Thomas Welsby in his book "Schnappering," published in Brisbane in 1905, says (p 81) .—

> "I remember witnessing a great scene of fun and excitement on the haul right in front of the reserve at Amity Point. A large school of mullet were coming in along the shore, but were too far out in the deep water for the blacks, when a number of porpoises were observed rolling about fully 500 yards away, and sunning themselves, in complete unconsciousness of the feast so near them. One blackfellow went down to the beach with a spear, which he prodded into the sand several times, and then struck the water with it at full length and flat along it or horizontally Instantly the porpoises answered the signal by dashing in and, of course, driving the poor mullet before them, when there was a rush of about twenty natives into them with their nets, and for the next few minutes nothing was to be seen but a confused mass of fish, porpoises and blacks, all mixed up together, out of which the blacks emerged with their nets as full as they could hold, and left the balance of the school to be worried by their curious allies '

The average reader may be sceptical and suggest that the association may be explained concisely by the old adage *post hoc, ergo propter hoc* Mr Welsby, however, who is one of the keenest of fishermen, says, "It is very easy to understand how the two came to work together in the strange way they did, for the porpoise is a very intelligent creature, and he soon found out that attendance on the blackfellow meant fish for him "

In view of the many observations made by different persons it appears that there is a good case for this remarkable illustration of commensalism.

[*END OF* Vol VIII, *MEMOIRS OF THE QUEENSLAND MUSEUM.*]

A J. Cumming, Government Printer, Brisbane

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